ELx800

AND VARIATIONS

SERVICE MANUAL

PN E7331005
Rev. C
August 1998

Table of Contents

Introduction ..... **vii**

Technical Notes ..... **ix**

Theory of Operation **10**

External Power Supply **11**

Internal Power Supplies **11**
+24 volts 11
+5 volt logic 11
V lamp 12
+12 volts 12
+12 VA 12
-12 VA 12
+5 VA 12
-5 VA 12

CPU **13**
Memory 13

Motor Drivers **13**
X Axis 13
Y Axis 13
Filter Wheel Motor **13**

Light Measurement Electronics **14**

Display & Keyboard **14**

Output Ports **15**

Optics **15**

Lamp **15**

Optics Arm **16**

Interference Filters **16**

Lower Optics Block **16**

Plate Carrier **16**

Error Appendix **17**

Maintenance **23**

Periodic Maintenance **23**
Lamp Replacement 23
Real Time Clock Battery Replacement 24

Optics/Photodiode Background 25
Photodiode Replacement Flow Chart 26
Daughter Board Replacement Flow Chart 27
Main Board Replacement Flow Chart 28
Replacement Kits 29
Replacing Photodiode (UDT) with Photodiode (T05) 29
Replacing Daughter Module 30
Replacing Main Module 31

Cleaning **32**

Decontamination **32**

Service Adjustments 32
Auto Calibration 32
Mechanical Alignment 34
Filter Wheel Motor Alignment 34
Carrier Alignment 34
Visual Check 34
Optics Arm Alignment 34
Keyboard Overlay Alignment 34

Performance Verification **37**

Power-up System Test 36
System Test 36
Calibration Test Plate 37
Verification of Performance Using Liquid Test Methods 39

Software Configuration Verification 42

Instrument Setup 42
Setting DATE / TIME 42
Time Check 43
Filter Table Setup 43
Time Verification 43

Download **52**
Equipment Required 52
Background Information 52
Procedure 53

Software Parts Number List **59**

Drawings/Bill of Materials for Main Board with Photodiodes. **60**

Assembly Drawings **60**

Schematic Diagrams **61**

Bill of Materials **62**

Drawings/Bill of Materials for Main Board with Daughter Modules **91**

Assembly Drawings **70**

Schematic Diagrams **71**

Bill of Materials **72**

Introduction

This document is a service manual. Its purpose is to provide technical information on the assembly and function of the *ELx800* line of instrumentation. It is to be used by experienced technical personnel along with the *ELx800* Operators manual to aid in maintenance and troubleshooting of the *ELx800* instrument. If additional information is required please contact Technical Service at one of the following numbers or mail correspondence to the listed address.

Bio-Tek Instruments, Inc.
Technical Assistance Center
Highland Park, Box 998
Winooski VT USA 05404-0998

1-800-242-4685 Monday - Friday 8:30am -5:30pm EST
1-802-655-4044 Outside of the USA
(32) 3-829-0455 From Europe

Document History

Revision	Date	Description
A	**7-18-95**	**Release to Production**
B	**10-1-96**	**Include Daughter PCB and New Main PCB**
C	**8-4-98**	**Added 7330415 Main PCB. Included the service procedures and data sheet**.

Technical Notes

This section is for periodic technical updates which are added to the manual at a later date.

- When replacing the Main PCB, R5 is of concern. If the reader is an *ELx800*, R5 is removed by cutting leads close to PCB. If the reader is an *ELx800*UV or an *ELx800*NB R5 remains installed.

- When using an *ELx800* of any variation, the power supply should be placed as far away from the reader as possible.

- When the printer is plugged into the reader before power up, the reader may hang during initialization. If this happens remove the printer cable and power up the reader, then plug in the printer.

Theory of Operation

The function of each area will be discussed in the order defined with in the table of contents in the front of the manual. Schematic diagrams as well as an electronics block diagram are included in the back of this document.

External Power Supply

The *ELx800* is designed to function from a regulated 24 volt DC power supply. It typically requires less then 1.6 amps peak to function . The external power supply provides 24 volts DC at 1.6 amps (min.) from line voltage between 90-264 VAC @ 50-60HZ. The output connector has the positive contact on the internal part of the barrel with ground on the exterior of the connector. The power supply is short circuit protected internally. Do not place the power supply close to the reader, place as far away as possible.

Internal Power Supplies

The *ELx800* internal power supplies are derived from the 24 volt DC input with the exception of the real time clock battery. This is a board mounted battery (3.5v lithium coin) which should last for 10 years
(*See Periodic Maintenance,page 23*). The power input is protected with a resetting (automatic) fuse (F1) as well as a transorb (CR2). So the input is protected from over voltage as well as reverse polarity. All voltage regulators are protected with internal (to the device) thermal protection circuits. All voltage converters are located on the main PCB.

+24 volts

This is the voltage input used as the source for all internal supplies as well as motor drive voltage. This is supplied by the external power supply.

+5 volt Logic

This power supply is a switch mode buck regulator which is used for all digital logic. U1 is the actual regulator with R1& R2 setting the output voltage. C1 and C2 are filter capacitors and L1 is the output choke. CR1 is a "catch" diode which provides a return path for the load current during the off cycle of the regulator.

V lamp

This power supply is a switch mode buck regulator which is used to power the lamp. It has an enable/disable control line which allows the main processor to switch the lamp on or off. U2 is the actual regulator with R3 and R4 setting the output voltage. This supply also has provisions to run at a different voltage for the 7330410 Main PCBs, R5 will change the output voltage to a different higher voltage (**Note**: R5 is installed on UV and narrow beam instruments; R5 is removed for plain *ELx800* readers. Damage will occur to the bulb if R5 is not used properly.) For the 7330415 Main PCBs, Jumper P1 sets the lamp voltage. Jumper P1 is removed for standard models. P1 is installed for UV and Narrow Beam versions. C4 and C5 are filter capacitors and L2 is the output choke. CR3 is the catch diode which provides a return path for the load current during the off cycle of the regulator. Visible range normal beam instruments use 3.75 volts at .5amps, UV and narrow beam instruments use 4.25 volts at 1.2amps. With R5 installed lamp voltage increases to 4.2volts.

+12Volts

This power supply is a linear regulator (U5) which converts 24volts to +12 volts. R8 and R9 set the output voltage. This +12 volt output is a source for the -12VA,+12VA and +5VA power supplies. The +12V is also used for driving the audible alarm. This is a low current power supply which under normal operation needs no heat sink.

+12VA

This is branch of the +12V supply separated by a resistor. This output is used for the source of the +5VA as well as the positive supply for some bipolar devices.

-12VA

This power supply is a positive to negative voltage converter. The supply creates -12 volts from a +12 volt source. U4 is the device which has no external resistors. C7 and C18 are essential to the correct operation of this charge pump device. This supply is used as the negative supply for bipolar devices as well as the source for the - 5VA supply.

+5VA

This power supply is a linear regulator (U7) which converts +12V in to +5.0v for use as the positive supply for the A\D converter (U9).

-5VA

This power supply is a linear regulator (U6) which converts -12VA in to -5.0V for use as the negative supply for the A\D converter (U9).

CPU

Refer to pages 1-2 of the 7330400-SC , 7330410-SC or 7330415-SC. The *ELx800* uses a 16 bit 80C186EB (U30) microprocessor which runs at 16MHZ . The clock frequency is derived from a 32MHZ crystal (U28). The power-on reset is provided via a solid state device (U29). The system has a real time clock (U40) which has an external battery (BT1 3.0 volt lithium coin).

Memory

The CPU uses a variety of memory. A block of FLASH EPROM (U49,U34 16X524288 bits) is used for storage of application programs. A smaller block of FLASH EPROM (U50,U35 16X131072 bits) is used for variable assay parameter storage. A block of STATIC RAM (U51,U36 16X131072 bits) is used for program operation storage and a block of EPROM (U52,U37 16X32768 bits) is used to store the boot up program.

Motor Drivers

Refer to page 5 of the 7330400-SC, 7330410-SC or 7330415-SC. The *ELx800* has 3 identical .45 amp stepper motor drive circuits. All three have micro step capability (1/16 step resolution). A common 2.5 volt reference is shared by all three drive circuits (U27). Each drive circuit has a D/A converter (U24,53,38) and a precision stepper motor driver (U25,54,39). The motor driver chips all have internal oscillators with external components for setting the frequency (R28 and C57 for example). Current through the each motor winding is controlled by sensing the voltage across the 1 ohm sense resistor (R31 for example) and comparing that voltage to the reference voltage output by the D/A converter. When the voltages are the same the current to the winding is shut off by a comparator internal to the motor driver chip.

X Axis

The X axis is the axis which moves the carrier left to right. This axis homes to an optical sensor mounted on the Moving Interconnect (7330401-SC) circuit board mounted on the X axis rail mount casting. The X axis motor is also mounted to the same casting. Motor drive signals are sent via the FLEX cable from the mother board to the moving interconnect circuit board. The flex cable is installed with a specific polarity see 7330005-AS. Drive motion is transmitted via a toothed belt which is attached to the carrier. The belt is automatically tensioned and needs no adjustment.

Y Axis

The Y axis is the axis which moves the carrier forward and backward. This axis homes to an optical sensor mounted in the front left corner of the base frame. The Y axis motor is mounted at the rear left corner of the base frame. Drive motion is transmitted by a toothed belt which is attached to the X-axis rail mount casting. The belt is automatically tensioned and needs no adjustment.

Filter Wheel Motor

The filter wheel is driven by a stepper motor mounted to the center of the base frame. The motor has a small gear mounted to its output shaft which engages in teeth on the perimeter of the filter wheel. The filter wheel motor is aligned when installed using jig # 7332500 (see 7330005-AS).

Light Measurement Electronics

Refer to page 6 of the 7330400-SC, 7330410-SC or 7330415-SC. The *ELx800* uses a silicon photo diode (CR6) to detect the light passing through the interference filter. The current produced in the diode is transformed to a voltage by U19. This voltage is amplified by a variable gain stage made up of U17 and U18. The variable gain stage is used to increase the signal level to the A/D (U9) so that most of the A/D signal range is used. This is necessary because each frequency interference filter passes a different amount of light. A precision voltage reference (4.50V) is used to scale the A/D (U10&1/2 of U12). The A/D (U9) is a 16 bit analog to digital converter. Data is serially output to U13 and U14 .

Display & Keyboard

Refer to pages 3 and 4 of the 7330400-SC, 7330410-SC or 7330415-SC. The *ELx800* uses a board mounted 2X24 character LCD display. The contrast of the display can be varied via RT1 on the mother board (see periodic maintenance section 6.4 for access instructions). The keypad is a membrane type non tactile switch matrix. The key pad is shielded with a conductive layer under the graphics layer. This shield has a separate conductive adhesive backed tab which is attached to the inside of the base frame of the unit. This shield is for electrostatic discharge (ESD) protection.

Output Ports

Refer to pages 3 and 4 of the 7330400-SC, 7330410-SC or 7330415-SC. The *ELx800* has a 25pin Serial port as well as a 25pin parallel port located on the rear panel of the instrument. The serial port is a DTE configuration with a 25 pin (pin-male) Dsub connector. The parallel port is a 25 pin (socket-female) Dsub connector. The following pin definitions apply:

Serial Port

Pin	Signal	Pin	Signal
1	NC	19	NC
2	TX	20	DTR
3	RX	21	NC
4	RTS	22	NC
5	CTS	23	NC
6	DSR	24	NC
7	GND	25	NC
8	DCD		
9	NC		
10	NC		
11	NC		
12	NC		
13	NC		
14	NC		
15	NC		
16	NC		
17	NC		
18	NC		

Parallel Port

Pin	Signal	Pin	Signal
1	PSTROBE	19	GND
2	D0	20	GND
3	D1	21	GND
4	D2	22	GND
5	D3	23	GND
6	D4	24	GN
7	D5	25	GND
8	D6		
9	D7		
10	NC		
11	BUSY		
12	NC		
13	NC		
14	NC		
15	NC		
16	RESET		
17	NC		
18	GND		

BioTek # 75053 is a DB9F to DB25F serial cable
BioTek # 75049 is a DB25M to Centronix parallel cable

Optics

The *ELx800* uses a single optics channel for measurement. No reference channel is used. The light from the bulb is shaped and bent 90 degrees by the optics arm. The light beam then passes through the sample and then through an interference filter mounted in the filter wheel. Light passing through the interference filter then passes through the secondary optics block to the photo diode. The photo diode produces a current which is proportional to the amount of light striking it. This current is measured by the analog front end circuit on the mother board.

Lamp

The *ELx800* uses two types of lamps. Visible range instruments use a gas filled tungsten bulb which is run at 3.5volts and is on at all times. Narrow beam and UV instruments use a 4.2volt bulb which is also on all of the time. There is a simple bulb alignment procedure for each type of bulb. *Refer toLamp Replacement, page 23*. The lamps intensity will slowly drop over time until the instruments run time self check detects a low signal level and flags the user via the display.

Optics Arm

The optics arm houses the primary optics and the lamp. The entire optics arm is factory aligned to the secondary optics. Realignment requires alignment jig # 7332503 see assembly drawing 7330500-AS. This should not be necessary in the field. The *ELx800* will be made in several different models. In addition to the normal visible range instrument there will be a UV version and a narrow beam version. These models will have different optics arm assemblies which are not interchangeable but they are aligned in the same way.

Interference Filters

The *ELx800* uses interference filters to select the desired frequency of light. These filters are mounted in the filter wheel within the filter wheel cover below the optics arm. A maximum of 5 filters can be installed at one time. All unused filter locations must carry blank filters or errors will result (error #0X500). The interference filters have a specific orientation defined by an arrow stamped on the side of the filter. The arrow should point down in the direction the light is going.

The standard *ELx800* instrument can use filters from 400 to 750 nm order # 2874XXX where the XXX is the pass frequency in nanometers.

Lower Optics Block

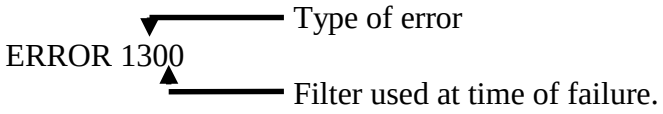
The lower optics block is used to collimate the beam so that it fits the photo diode in all plate reading conditions. A BG-18 (BTI# 7332001) filter is housed within the lower optics block. This filter is necessary to attenuate specific light frequency ranges. See assembly drawing 7330005-as for specific assembly information.

Plate Carrier

The plate carrier is the assembly which holds the plate to be read. It is presented to the user to the left of the display at power up. Micro plates are held in place with use of a plate retention spring. The plate carrier is factory aligned to the X-axis with jig # 7332502 see 7330005-As for specific instructions. Realignment is required if the bearing block screws are loosened. The plate carrier carries the X-Axis homing tab on the rear left corner. This tab interrupts the X-Axis opto sensor when the carrier is moved home. A grounding leaf spring is also employed to protect the instrument from Electro Static Discharge events. An anti backlash spring/roller bearing is employed to bias the carrier bearing backlash. **Carrier alignment should be verified and the bearing block retention fastener should be torqued whenever the instrument is serviced.**

Error Appendix

The following is a list of displayed error codes and what they mean. The error code is displayed as the last four digits. The instrument will still respond to keypad input to stop the beeper and return to the main menu in most cases. In cases where there are several elements such as filters or motors the right most digit will identify the element in error.



filter 1=1	motor 1 = X axis (forward /back)
filter 2=2	motor 2 = Y axis (left/right)
filter 3=3	motor 3 = filter motor
filter 4=4	
filter 5=5	

Displayed Error	Potential Cause
ERROR 0100	**READ FUNCTION ABORTED**
ERROR 0200	**(MOTOR) COULD NOT FIND OPTO SENSOR**
ERROR 0300	**(MOTOR) COULD NOT FIND EDGE OF HOLE (AUTOCAL)**
ERROR 0400	**(MOTOR) FAILED POSITION VERIFY**
ERROR 0500	**FILTER WHEEL MISSING FILTER**
ERROR 0600	**(FILTER) GAIN OUT OF RANGE**
ERROR 0700	**READER FAILED NOISE TEST**
ERROR 0800	**READER FAILED OFFSET TEST**
ERROR 0900	**READ TIME (FILTER) DARK OUT OF RANGE**
ERROR 0A00	**READ TIME (FILTER) AIR/BLANK OUT**
ERROR 0B00	**INVALID (ASSAY NUMBER)**
ERROR 0C00	**PRINTER TIMED OUT**
ERROR 0D00	**CAL CHECK SUM ERROR**
ERROR 0E00	**FILTER WAVELENGTH SPECIFIED NOT IN FILTER TABLE**
ERROR 0F00	**FILTER SIGNAL OUT OF RANGE**
ERROR 1000	**CNFG DATA ERROR**
ERROR 1100	**CNFG CHECKSUM ERROR**
ERROR 1200	**CAL DATA ERROR**
ERROR 1300	**MOTOR NOT HOMED CORRECTLY (again)**
ERROR A100	**TASK CONTROL BLOCK NOT AVAILABLE**
ERROR A200	**READER FUNCTION ALREADY IN USE**
ERROR A300	**(DEVICE) NOT AVAILABLE**
ERROR A400	**FAILED CODE CHECKSUM TEST ON POWER UP**
ERROR A500	**DR STEPS ALLOC/FREE ERROR**
ERROR A600	**QUICK FLASH CONFIGURATION TIMED OUT**

The following errors would occur if the axis fails to home.

ERROR 0200 X AXIS MOTOR COULD NOT FIND OPTO SENSOR
ERROR 0201 Y AXIS MOTOR COULD NOT FIND OPTO SENSOR
ERROR 0202 FILTER WHEEL MOTOR COULD NOT FIND OPTO SENSOR

Probable cause: Disconnected sensor or motor. An obstruction limiting carrier movement, such as the carrier block (a loud grinding would be heard at power up).(*Errors 0200,0201)*
Probable cause: A bad bulb.*(Error 0202)*

The following errors would occur if the expected axis move did not encounter the light beam when expected during the AUTOCAL process

AUTOCAL Error Messages

ERROR 0300 X AXIS FAILED TO FIND LIGHT BEAM
ERROR 0301 Y AXIS FAILED TO FIND LIGHT BEAM
ERROR 0302 FILTER WHEEL DID NOT FIND HOME

These errors indicate that a particular axis was moved to a point where the light beam from the optics arm was expected to be detected by the measurement electronics but was not.

Probable cause: X or Y axis cases - loose belt or loose motor pulley or bad motor drive which causes the carrier to not move where it was sent. Filter Wheel motor case - Filter wheel homing hole blocked, filter wheel drive gear loose or motor drive failure causing inadequate filter wheel movement. A bad bulb could be responsible for the filter wheel not finding the home position.

ERROR 0400 X AXIS FAILED POSITION VERIFY
ERROR 0401 Y AXIS FAILED POSITION VERIFY
ERROR 0402 FILTER WHEEL FAILED POSITION VERIFY

These errors indicate that an axis failed its position verify test. The position verify test keeps track of all axis moves so that when the axis returns home it is expected at a specific step count. If the axis gets home early (to few steps) or late (to many steps) the test fails.

Probable cause: Belt slipping cause by incorrect tension, loose motor pulley or loose belt clamp. A bad motor drive circuit.

ERROR 0500 FILTER IS NOT INSTALLED

This error indicates that the filter wheel has an open filter location.

Probable cause: All filter locations must have either a filter or a filter blank (BTI# 2872086) installed or this error will result. If the entire wheel is not installed this error will also result.

ERROR 0601 FILTER #1 GAIN OUT OF RANGE
ERROR 0602 FILTER #2 GAIN OUT OF RANGE
ERROR 0603 FILTER #3 GAIN OUT OF RANGE
ERROR 0604 FILTER #4 GAIN OUT OF RANGE
ERROR 0605 FILTER #5 GAIN OUT OF RANGE

These errors indicate that the gain necessary to use the filter in question is out of the range necessary to assure performance to specifications.

Probable cause : A bad interference filter, missing filter or a bad lamp could cause this error. Misaligned optics could also cause this error.

ERROR 0700 READER FAILED NOISE TEST

This error indicates that the reader noise test failed. The reader noise test checks the DARK current signal level for stability. Dark current is measured with the light blocked at maximum measurement channel gain. Four groups of 96 readings are taken at 100ms intervals. This data is reduced to four averages which can not vary by 20 counts or a 0700 error will result. The out going production specification for this test is 12 counts of variation.

Probable cause: External signals getting in to the measurement circuit. The bottom and top shrouds should be correctly installed as well as the filter wheel cover. This problem in a correctly assembled unit could indicate a bad mother board (7330400, 7330410 or 7330415) or daughter board (7330404 or 7330414) , photo diode or power supply to close to unit. Failure indicates excessive variation in the dark current (background) noise levels of the measurement circuit.

ERROR 0800 READER FAILED OFFSET TEST

This error indicates that the measurement electronics dark current offset is outside of acceptable limits at maximum gain. The noise signal level must be between 144 and 2019 counts or an error will be set. Production limits are 288-1875.

Probable cause: Ambient light leak , bad mother board (7330400, 7330410 or 7330415) , daughter board (7330404 or 7330414) , photo diode or power supply to close to unit.

ERROR 0900 READ TIME DARK VALUE OUT OF RANGE

This error indicates that the dark current value taken during the current read is significantly different then the same reading taken during the power up self check.

Probable cause: The measurement electronics background noise has changed since the last power up self check. Could be caused by a large increase in external ambient light since power up.

ERROR 0A00 READ TIME AIR BLANK OUT OF RANGE

This error indicates that the blank (full signal) reading taken during the current read has changed significantly from the same reading taken during the power up self check.

Probable cause: The measurement electronics full signal level has changed since the power up self check was last run. The bulb could be near failure or the optics could be interfered with.

ERROR 0B00 INVALID ASSAY

This error indicates that an assay number that is not programmed was selected.

ERROR 0C00 PRINTER TIMED OUT

This error indicates that the printer in use is not responding

ERROR 0D00 CALIBRATION CHECK SUM ERROR

This error indicates that the stored check sum value for the calibration data does not match the actual check sum

ERROR 0E00 WAVELENGTH NOT FOUND IN FILER TABLE

This error indicates that the specified assay wavelength is not in the filter table. If a filter is added to the filter wheel the filter table must be updated or this error will occur .

ERROR 0F00 FILTER SIGNAL OUT OF RANGE

This error indicates that the filter (1-5) has a signal which is out of range. This error could be produced by putting a UV in a non "UV" instrument. This error could also be produced by having a blank filter in a position which is programmed to actually have a filter installed. The filter table must match the filters actually installed in the filter wheel.

ERROR 1000 CONFIGURATION DATA MISSING

This error indicates that necessary configuration data is missing from memory. Which probably means it was never downloaded or it was downloaded incorrectly.

ERROR 1100 FAILED CONFIGURATION CHECK SUM TEST

This error indicates that the stored checksum value from the configuration data does not match the actual checksum of the current configuration data. This means that the configuration data has changed and the check sum stored is no longer valid. The error is produced when outdated versions (old) of Extensions or Define Assay are used to create an assay configuration file. This file is incompatible with the operation code within the instruments memory. The fix for this problem is to recreate the assay definition on the correct version of assay definition software and re-download it.

ERROR 1200 CALIBRATION DATA MISSING

This error means that AUTOCAL has not been performed after a memory erase or in the case of a new unprogrammed board immediately after the assay definition download. The system must have the AUTOCAL sequence performed. See Section 8.10 in this manual.

ERROR 1300 MOTOR NOT HOMED

This error will occur if the error 0200 or error 0300 is ignored. The situation needs to be fixed before the instrument is used.

Maintenance

Periodic Maintenance

The *ELx800* has no periodic maintenance schedule. The only area of the instrument which is expected to need replacement is the lamp. Periodic cleaning of the top surface of the base frame with a mild detergent is probably a good idea. Decontamination is also required if the unit is to be shipped and it has been in contact with possible infectious material.

Lamp Replacement

To replace the lamp follow the following instructions:

Note: For the 7330501S bulbs in the regular instrument (non UV or NB) refer to 7330522-AS

1. Unplug the instrument and flip it over on its back.

2. Remove the 4 black slotted screws which retain the top shroud

3. Flip the instrument over again and lift the top shroud off.

4. **Loosen** (do not remove) both **3/32" hex screws** which hold the lamp in place.

5. Slide the bulb out backward and disconnect it from the connector at the back of the optics arm.

6. Connect the new bulb insert the new bulb into the bulb retention springs.

7. Power up the unit. The lamp should light and the instrument will initialize. An error may or may not happen. Ignore any errors and press the stop key to stop the error (beeper).

8. To align the bulb follow the steps outlined below:

    A. Press the UTIL key form the main menu. Press the SETUP key then press the MORE key twice. Now press the BULB ALIGN key. The carrier will move into a position which blocks the light beam.

    B. Push the bulb forward until it stops then rotate and or swing the bulb back and forth to obtain a full circular image on the carrier surface. Tighten the bulb retention screws and check that the image is still full and round.

    C. Power down the instrument and reinstall the top shroud.

Lamp Replacement (UV, Narrow Beam)

> **Note: For the 7330509 used in UV and NB instruments** *Refer to 7330523-AS (UV) and 7330524-AS (NB) and page 3 of 7330005-AS*. The bulb gets extremely hot during this procedure.

1. Unplug the instrument and flip it over on its back.
2. Remove the 4 black slotted screws which retain the top shroud
3. Flip the instrument over again and lift the top shroud off.
4. **Loosen** (do not remove) both **phillips head screws** which hold the lamp in place.
5. Slide the bulb out backward and disconnect it from the connector at the back of the optics arm
6. Connect the new bulb insert the new bulb into the bulb retention springs.
7. Power up the unit. The lamp should light and the instrument will initialize. An error may or may not happen. Ignore any errors and press the stop key to stop the error (beeper).
8. To align the bulb follow the steps outlined below.

    A. Press the UTIL key form the main menu. Press the SETUP key then press the MORE key twice. Now press the BULB ALIGN key. The carrier will move into a position which blocks the light beam.

    B. Push the bulb forward leave about 1/8" of an inch clearance to the first aperture. The bulb must not touch the aperture. Rotate and or swing the bulb back and forth to obtain a full circular image on the carrier surface. Tighten the bulb retention screws and check that the image is still full and round.

    C. Power down the instrument and reinstall the top shroud.

Real Time Clock Battery Replacement

The *ELx800* has a 3.0v lithium battery which powers the real time clock circuit. In the event that the instrument fails to keep accurate time and date, the real time clock battery should be replaced. Follow the below instructions to gain access to the battery.

1. Turn the instrument off and disconnect the power cord. Flip the instrument on its back and remove the 4 black slotted screws which hold the top shroud. Also remove the 6 hex (9/64") head screws which retain the base pan.

2. Lift the base pan off of the instrument and set it aside. This will expose the main circuit board. The battery is along the front edge of the board. Use a small screw driver to pry it out of the battery holder. Replace the battery with a new one (BTI #47049, or Renata #CR2450N 3.0v lithium Coin). Mark the battery with the date installed so that battery age can be determined at a later date.

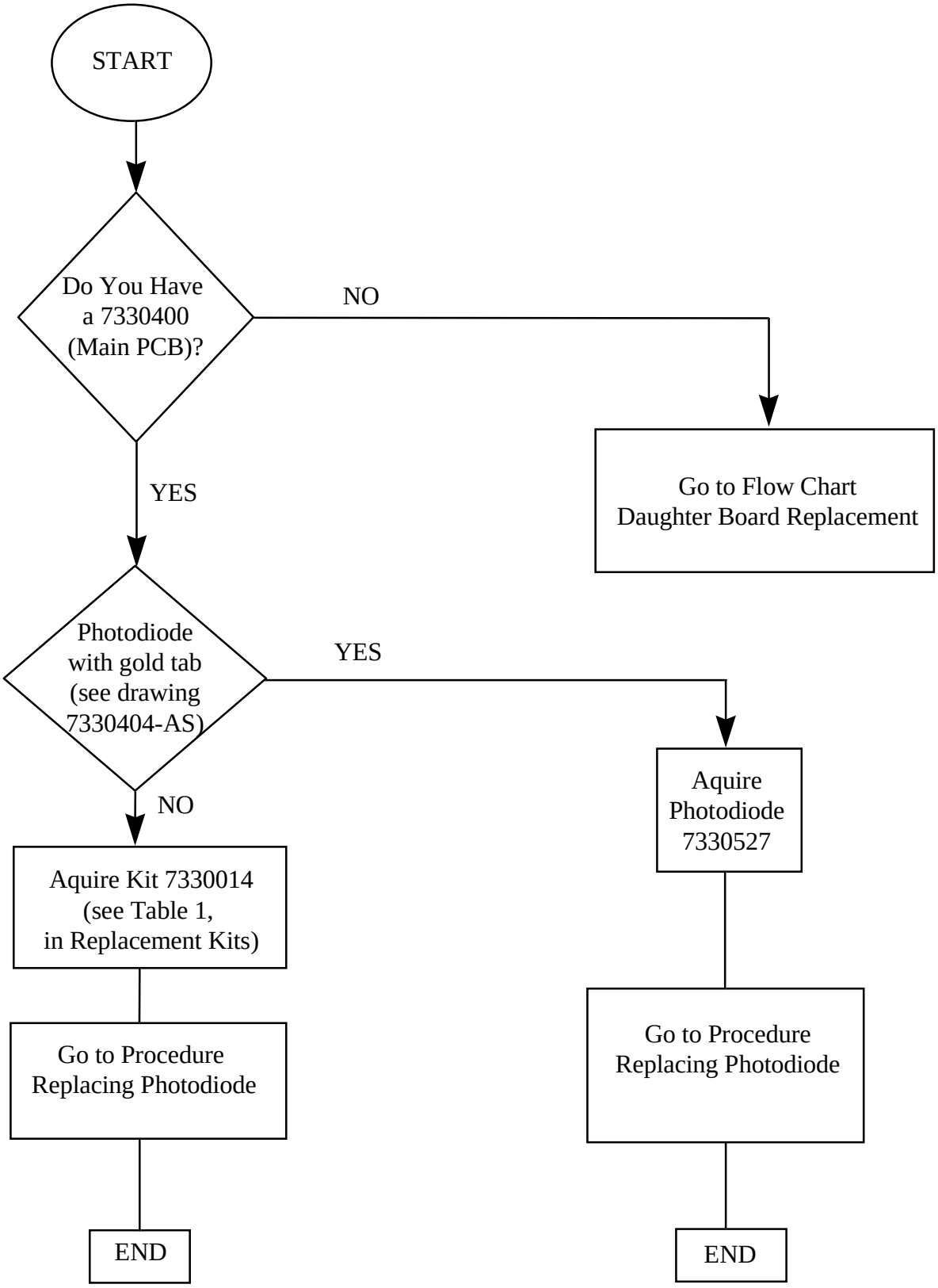
3. Replace the base pan and all of the screws. The black slotted screws go in the holes which hold the top shroud down, these are the ones which have a larger space between the base pan and the standoff inside. The standoffs which touch the base frame take the hex head screws.

4. The instrument should keep time correctly once the time has been set (see operators manual). If this is not the case another problem exists with the mother board.

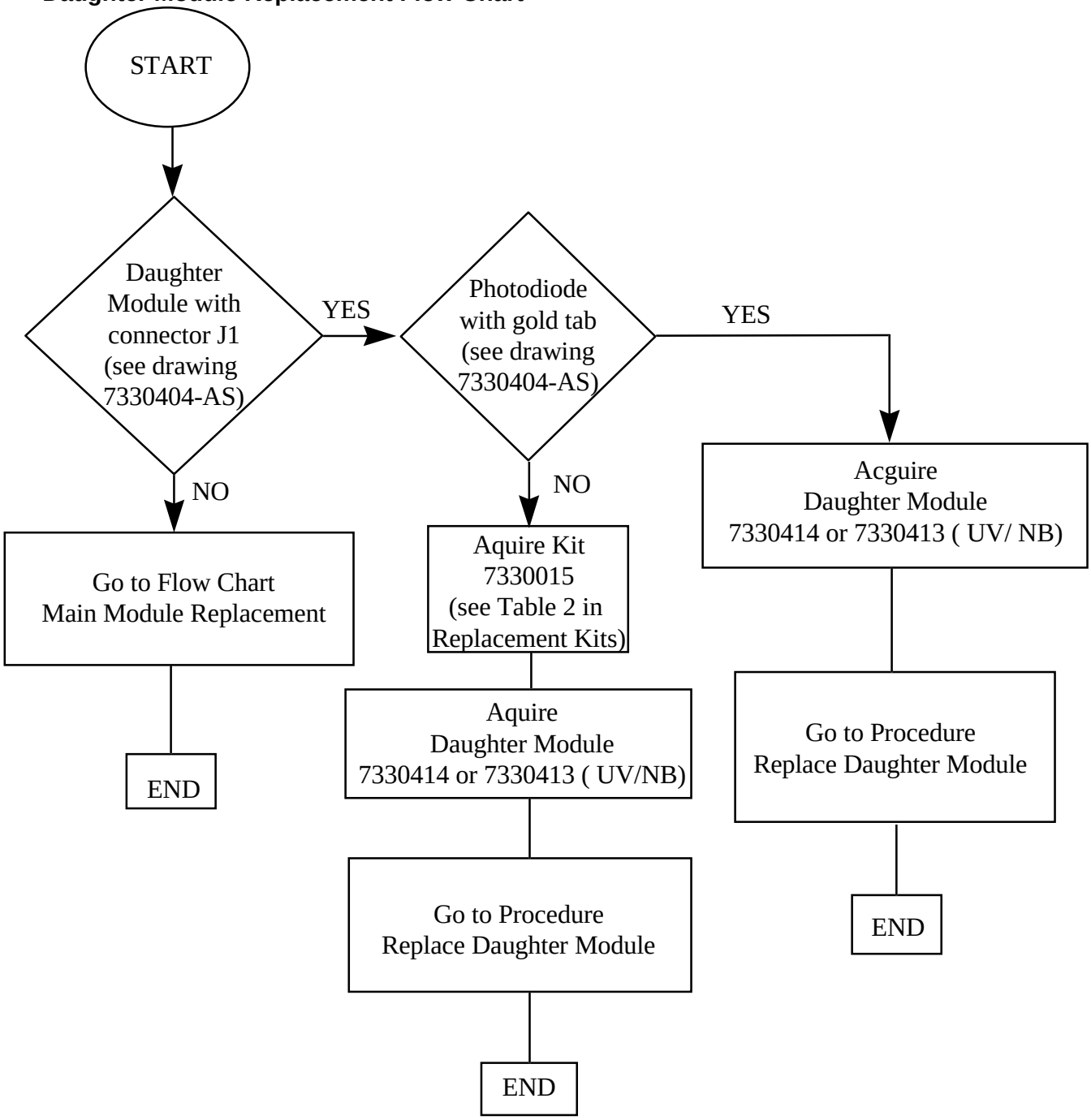
Optics/Photodiode Background

At time of printing of this manual, there are multiple optic/photo diode configurations. The original configuration had a photo diode soldered to the main board (7330400). A modification was made to place the photo diode on the daughter module (7330404,403). This was to reduce noise errors. The daughter board also has more then one configuration. The original daughter (7330404,403) module used a UDT photo diode (**Silver**). The current daughter module (7330414,413) uses a Hamamatsu T05 photo diode (**Gold**). Use the following flow charts to determine what module and kit is needed for replacement.

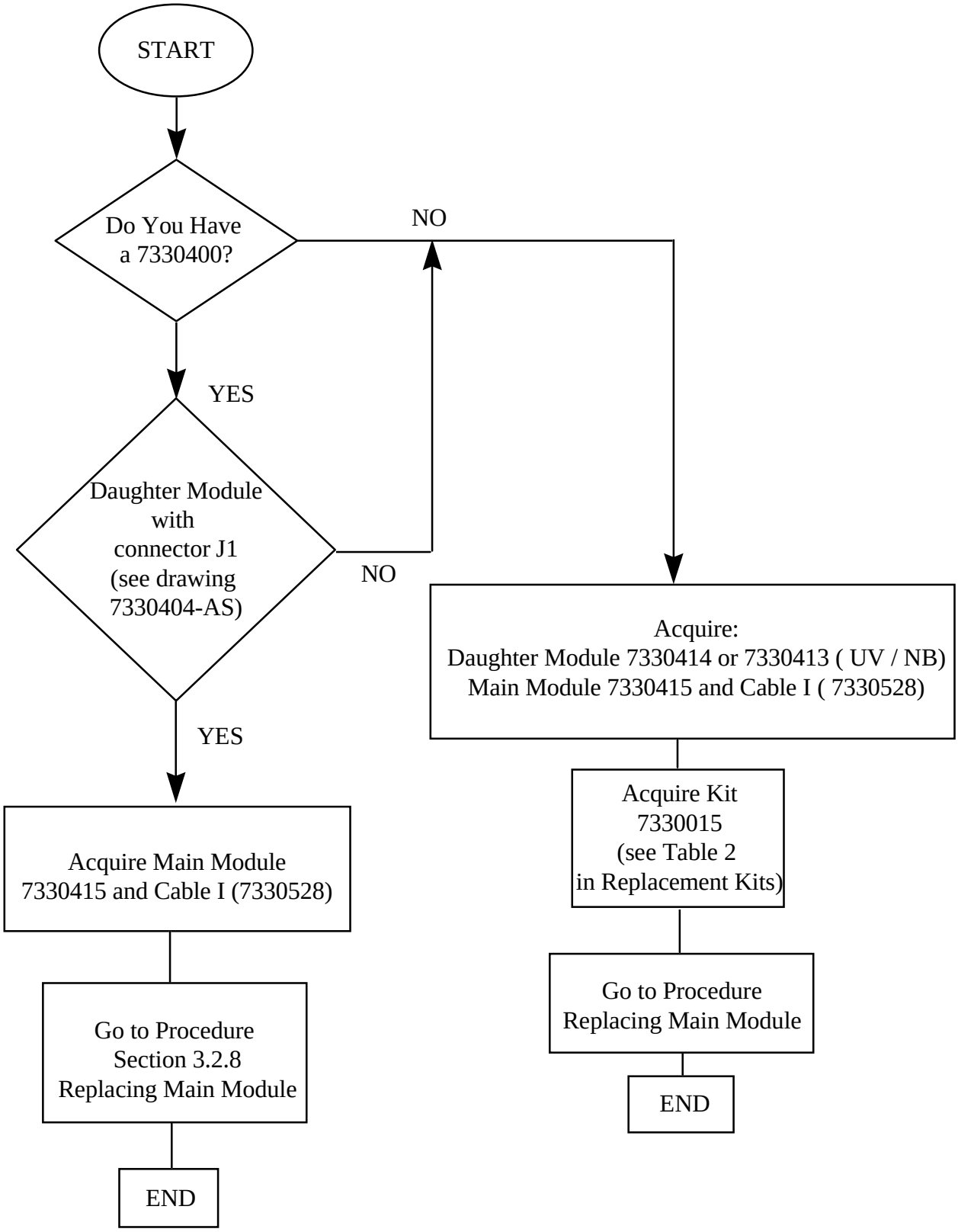
Photodiode Replacement Flow Chart



Daughter Module Replacement Flow Chart


START
Daughter Module with connector J1 (see drawing 7330404-AS)
YES
Photodiode with gold tab (see drawing 7330404-AS)
YES
NO
NO
Go to Flow Chart Main Module Replacement
END
Aquire Kit 7330015 (see Table 2 in Replacement Kits)
Aquire Daughter Module 7330414 or 7330413 (UV/NB)
Go to Procedure Replace Daughter Module
END
Acguire Daughter Module 7330414 or 7330413 (UV/ NB)
Go to Procedure Replace Daughter Module
END

Main Board Replacement Flow Chart


START
Do You Have a 7330400?
NO
YES
Daughter Module with connector J1 (see drawing 7330404-AS)
NO
YES
Acquire:
Daughter Module 7330414 or 7330413 (UV / NB)
Main Module 7330415 and Cable I (7330528)
Acquire Kit 7330015 (see Table 2 in Replacement Kits)
Go to Procedure Replacing Main Module
END
Acquire Main Module 7330415 and Cable I (7330528)
Go to Procedure Section 3.2.8 Replacing Main Module
END

Replacement Kits

Kit for replacing Photo diode on main PCB 7330400: (Part # 7330014)		
1	7330527	Hamamatsu Photo diode with extended leads **(Gold)**
1	7332001	BG18 Filter (Blue glass)
1	7332084	Spring
1	7332085	Spacer ring

Table 1

Kit for installing daughter module: (Part # 7330015)		
1	7332085	Spacer ring
1	7332001	BG18 Filter (blue glass)
1	7332084	Spring
2	18038	Nylon washer
2	19189	Philip screws
2	16052	Washer .187ID, .312OD, .050THK NY
1	7331021	Daughter Module Replacement Instructions

Table 2

Kit for replacing the 7330414 module:		
2	18038	Nylon washers
2	19189	Philip screws
2	16052	Washer .187ID, .312OD, .050THK NY

Table 3

Replacing Photodiode (UDT) with Photodiode (T05).

NOTE: To accomplish this task a kit must be acquired.

1. Turn the instrument off and disconnect the power cord. Turn the instrument on its back and remove the 4 black slotted screws which hold the top shroud. Also remove the 6 hex (9/64") head screws which retain the base pan.

2. Lift the base pan off of the instrument and set it aside. This will expose the main circuit board. The photodiode is placed within the square cut out of the main board.

3. Unsolder the two leads of the photodiode. Remove the two hex screws and plastic washers. Remove the photodiode from the optic holder.

4. The internals of the optic holder must be replaced (*Refer to the drawing,* ***Service Replacement Optics****, supplied with the kit*). The current internals of the optics holder will include two spacers, BG18 Filter (blue glass), and a lens. The BG18 Filter and the lens will be reused. Through away the two spacers.

5. Clean the lens and BG18 Filter. Place the lens, spring, BG18 Filter, and spacer into the optic holder in the following order:

6. Solder the T05 photodiode on the main board. This is done by taking the lead closes to the tab of the photodiode is placed in the slot marked "A" on the main board. The other lead is placed into the slot marked "C" on the main board.

7. Bend the leads at least ¼" away from the base of the photodiode, until the photodiode is in the spacer. Use the same screws and plastic washers, to screw down the photodiode.

8. Replace the base pan and all of the screws. The black slotted screws go in the holes which hold the top shroud down, these are the ones which have a larger space between the base pan and the standoff inside. The standoffs which touch the base frame take the hex head screws.

Replacing Daughter Module

NOTE: Do not handle the new daughter module without gloves or protective covering to prevent oils and dirt from contaminating the module. This module is very sensitive to humidity and static.

1. Turn the instrument off and disconnect the power cord. Turn the instrument on its back and remove the 4 black slotted screws which hold the top shroud. Also remove the 6 hex (9/64") head screws which retain the base pan.

2. Remove the base pan from the instrument and set it aside. This will expose the main circuit board.

3. While wearing cotton gloves and being static sensitive, remove the two Philips screws and washers (if installed) holding down the daughter board, **careful** not to lose the two washers under the daughter board (if installed). Disconnect the daughter board from the main board. Install the daughter board in reverse order.

Replacing Main Module (7330400 or 7330410) with 7330415

Main Module and Daughter Module Replacement

1. Turn the instrument off and disconnect the power cord. Turn the instrument on its back and remove the 4 black slotted screws which hold the top shroud. Also remove the 6 hex (9/64") head screws which retain the base pan.

2. Lift the base pan off of the instrument and set it aside. This will expose the main circuit board. The photo diode is placed within the square cut out of the main board.

3. The internals of the optics holder must be replaced. The current internals of the optics holder will include two spacers, BG18 Filter (blue glass), and a lens. The BG18 Filter and the lens will be reused. Through away the two spacers, two hex screws, and the two plastic washers.

4. While being static sensitive, remove the main board and install the new main board as follows:
   - Disconnect all the connectors and remove the Philip screws mounting the board.
   - Remove the main board from base pan.
   - Install the new main board in reverse order.

   NOTE: P1 is a jumper on the main board. If the reader is a standard *ELx800*, remove P1. The line voltage will be 3.75 V. If the reader is a *ELx800*UV or NB version, keep P1 shorted This will set the line voltage to 4.25 V. (*See 7330415-AS drawing, page 7 of 8*.)

5. Clean the lens and BG18 Filter. Place the following into optic holder in the following order. Lens, spring, BG18 Filter, and spacer.

6. While wearing cotton gloves, plug the current amplifier cable (7330528) into the daughter board and the main board (7330415). Place a plastic washer over both screw holes of the optic holder. Place the photodiode (of the daughter board) into spacer. Place a plastic washer on both screws and screw down daughter board. The layers should be: optic holder, washers, daughter board, washers, and screws.

7. Replace the base pan and all of the screws. The black slotted screws go in the holes which hold the top shroud down, these are the ones which have a larger space between the base pan and the standoff inside. The standoffs which touch the base frame take the hex head screws.

8. Perform the download procedure (*page 47*).

9. Perform the Autocalibration (*page 32*).

Cleaning

The following guidelines can be used to clean the *ELx800* instrument. The instrument should be **turned off and unplugged before cleaning.**

Exterior surfaces- All exterior surfaces can be wiped down with a moist cloth. use a mild detergent/water solution.

Interior Surfaces (top of base frame)- With the top shroud removed the entire top of the unit can also be wiped down with a moist cloth. Use a mild detergent/water solution.

X and Y axis rails- These can be cleaned with alcohol on a cloth. This will remove any residue which may have built up over time. Do not lubricate the rails, the bearing material is self lubricating adding a lubricant would likely attract dirt and lower the rail and bearing life.

Primary Optics- The primary optics in the optics arm should not need cleaning but if it has been disassembled and the optical components have been soiled use lens paper and alcohol to clean them. Be very careful of the front surface mirror this component can be scratched very easily and this could cause a reduction in performance.

I**nterference Filters**- The interference filters can also be cleaned with lens paper and alcohol. Be aware of the filters position and orientation and be sure to replace the filter in the same position it was in before it was cleaned. **If the positions are mixed up the instrument will use the wrong filter the next time it is used.**

Decontamination

See the operations manual for specific instructions on how to decontaminate the *ELx800* instrument.

Service Adjustments

The following is a list of adjustments which are possible on the *ELx800* instrument.

Auto Calibration

The Auto calibration process is done on every instrument which leaves the Bio-Tek manufacturing facility. Auto calibration removes the errors caused by slight differences in alignment from instrument to instrument.

The AutoCal jig is a tool which allows the *ELx800* to scan the actual location of the A1,A12, H1 and H12 microtiter well locations for a 96 well plate. These locations are then used to determine the well location map for reading a plate. If anything in the system is changed which invalidates the original Autocal information the test should be rerun to account for the new locations.

Autocal is hidden from the user. It can be run from the main menu under the test area. An Autocal jig is required to perform the alignment (PN# 7332508).

Autocal should not be needed if the unit has not been disassembled. If the Calibration Test plate shows misalignment the unit has likely sustained a shock which moved the carrier out of alignment. A complete instrument alignment check should be done to rectify what has been moved (see section 8.30-8.33).

To Run **AUTOCAL** follow the below instructions from the main menu. Use the soft keys below the display**:**

- **Press the UTIL key**
- **Press the SETUP key**
- **Press the first hidden key** (this is an unmarked key between the **CLEAR** and **ENTER** keys).

1. Insert the **AUTOCAL jig** in to the carrier with A1 in the upper left corner.

2. Press the **READ key** (in the lower right corner of the key pad).

3. The jig will be moved around inside the instrument and then ejected. The following (typical) report will be printed out the printer port at the end of the test.

AUTOCAL ANALYSIS

Upper Left Corner: X= 9156 Y= 10780
Lower Left Corner: X= 9148 Y= 16286
Lower Right Corner: X= 470 Y= 16290
Upper Right Corner: X= 474 Y=10782

X1 delta = 9156 - 9148 = 8
X2 delta = 470 - 474 = 4
Y1 delta = 10780 - 10782 = -2
Y2 delta = 16286 - 16290 = 6

The values are displayed as 16th steps. One whole step is .0072" so the actual coordinates of the upper left corner (A1) are as follows 9156/16 * .007" = 4.005" from home in the X direction and 10780/16 *.007" = 4.716" from home in the Y direction. These numbers represent the actual displacement from home position, not distance from the home sensor.

In production a delta of 16 is questioned as a possible problem.

When installing the AUTOCAL jig a visual check should be noted. The two carrier bearing blocks must both touch the top edge of the AUTOCAL jig and the left side of the AUTOCAL jig must fully contact the left edge of the carrier. If the AUTOCAL jig does not fit in the carrier as described the carrier is out of alignment and needs to be realigned.

The best way to check is to press the jig to the left side of the carrier and slide it forward. Both bearing blocks should touch jig at the same time**.**

This is most important when using a frame with microstrips because the frames are flexible and will tend to flex out of square if the carrier is also out of square. This could cause some loss of performance because the AUTOCAL locations would not exactly match those locations in the microstrip frame.

Mechanical Alignment

The following is a list of all of the critical mechanical alignments done to an *ELx800* during assembly. All of these alignment steps are called out and described in the assembly documentation in the rear of this manual. *See drawing 7330005-AS.*

Filter Wheel Motor Alignment

If a filter wheel motor is removed it needs to be aligned when it is reinstalled. This is done with jig # 7332500. *See 7330005-as page 2 for specific instructions*.

Carrier Alignment

The carrier is aligned to the carrier bearing blocks. If the carrier bearings have been moved or replaced this alignment procedure needs to be done. See 7330005-AS, page 1 for specific instructions. Jig number 7332505 is required for this alignment. Both bearing blocks are squared to the carrier with this jig.

Visual Check

A quick visual check of carrier alignment should be done with the AUTOCAL jig (7332508). When inserted in the carrier the AUTOCAL jig should make contact with both bearing blocks and the left side of the carrier. If visible gaps exist the carrier will need to be realigned and the AUTOCAL procedure needs to be rerun.

The best way to check is to press the jig to the left side of the carrier and slide it forward. Both plastic bearings should touch jig at the same time.

Optics Arm Alignment

If the optics arm has been moved it needs to be aligned. *See 7330005-AS, page 3 for specific instructions*. Jig number 7332503 is required for this alignment. **Autocal is required if the optics arm is realigned.**

Keyboard Overlay Alignment

If the keyboard overlay is to be replaced an alignment jig is useful to align the new replacement part to the top case. Jig number 7332501 is required for this alignment. It should be noted that the keyboard overlay will be very difficult to remove. It will be necessary to completely clean the old adhesive from the base of the instrument before application of the new overlay. If the adhesive is not completely removed the new keyboard overlay may not be reliable.

Performance Verification

Performance Verification

Several different ways exist to verify performance. The *ELx800* comes with internal checks which are available to the user to determine if the unit is in working condition.

Power-up System Test

The power up self check automatically checks signal to noise ratios for all filters in place and verifies that the gains being used are within tolerances. Failure of the power up system check indicates the unit is lacking a basic functional block. For example No bulb , No filter wheel in place or optics out of alignment could cause a power up self check error.

System Test

The system test is a subset of the power up self check which can be run anytime to verify proper signal levels from each filter. This test is accessed via the main menu screen under tests.

The following data will be printed out after the test is run.

SYSTEM SELF TEST

09:30 01/01/95
Operator ID:_____
Notes:_____
_____

Filter :	**405**	**Dark :**	**1178**	**Air :**	**59104**	**Gain :**	**16.24**
Filter :	**450**	**Dark :**	**1161**	**Air :**	**59528**	**Gain :**	**3.51**
Filter :	**490**	**Dark :**	**1162**	**Air :**	**59056**	**Gain :**	**3.94**
Filter :	**630**	**Dark :**	**1161**	**Air :**	**59628**	**Gain :**	**3.28**

Noise Signal Range 1256-1261

SYSTEM TEST PASS

The gain values listed above are typical for the frequencies listed, significant variances are indications of system problems. Higher then normal gain values indicate low signal (old bulb, dirty optics, misalignment, marginal interference filter). Lower gain values could indicate a filter in the wrong place. For example if a 405nm filter was in position 2 and the filter table in the instrument was programmed as it appears above, the gain for the 450 filter would be 16.24 instead of 3.51 correspondingly the 405nm gain value would be 3.51 instead of 10.24 . This is a very likely problem because the customer is likely to forget to modify the filter wheel table in memory after manipulating the actual filter locations in the filter wheel.

The dark current value is the signal measured by the measurement electronics when the light is blocked by the filter wheel. If the dark current value is significantly different it is either an indication of an ambient light leak or the presence of a strong electrical noise source. Strong ambient light sources should be eliminated from the working environment. The instrument will be susceptible to both electrical and light noise with its covers (top & bottom) off. **Do not attempt to test the unit for performance unless both covers are in place.**

The Noise Signal Range test is done by blocking the light with the filter wheel and amplifying the dark signal with a programmed gain of 36. The window of acceptance is as follows. Four consecutive groups of readings are taken and averaged (4X96). The averages must fall within a 20 count window. The four readings must also be within the range of 144 - 2019 counts. Readings which don't satisfy this criteria will produce a failure.

Calibration Test Plate

Warning: The 9000547 Calibration Test Plate of Serial number XXXXX and up are valid with this instrument. Other Calibration Test plates will fail the alignment portion of the test**.**

The Calibration Test Plate is a tool for performance testing. It is basically a micro titer sized plate which carries optical standards as well as alignment holes. The *ELx800* has calibration test plate tests built in to its operating system. Each calibration test plate comes with N.I. S. T. traceable data for each optical standard at 8 different wavelengths. This standard data needs to be programmed in to the *ELx800* via the setup option from the main menu. When run the following report will be sent out the printer port.

CALIBRATION PLATE ANALYSIS

09:57 AM 01/17/95 Read Mode : Normal Filter: 405

Operator ID: _____Notes:_____
_____

Alignment Results

B2=0.000 PASS B12=0.000 PASS G1=0.000 PASS G11=0.000 PASS

	C01	D04	E02	F05	G03	H06
Standard	0.618	2.687	1.212	2.234	1.773	2.799
Data	0.624	2.737	1.221	2.256	1.790	2.867
Result	PASS	PASS	PASS	PASS	PASS	

Repeatability Results

	C01	D04	E02	F05	G03	H06
READ 1	0.624	2.737	1.221	2.256	1.790	2.867
READ2	0.624	2.747	1.222	2.262	1.793	2.885
RESULT	PASS	PASS	PASS	PASS	PASS	

The standards for six filters were programmed in to the instrument.

Alignment- The Alignment data indicates that the light beam was not cut by the alignment hole. This means that the instrument is in alignment. Readings in the alignment wells of more then .008 counts indicated misalignment during production . Errors are flagged for the user at .015 counts. A perfectly aligned instrument would have 0.000 in all four corners.

Accuracy/Linearity- The standard and the actual data are compared for an accuracy/linearity check The *ELx 800* is specified to 2.500 abs @ 405nm so above these values will not flag an error. For values below 2.500abs a composite tolerance is used to determine compliance to advertised specifications.

Accuracy of *ELx800*	+/-1% +/-.010abs
Accuracy of Standard measurement device	+/-1%
Error in measurement position of glass	+/-.010abs
The instrument must measure the standard within	+/-2% +/-.020 abs

This is the criteria used to determine a pass/fail result. In production, we use a +/-1.5% +/-.015abs to determine a pass/fail result.

Repeatability- The plate is read twice during the test. The second read is compared to the first read and the following specification is applied to determine a pass/fail result.

Repeatability of the *ELx800* +/-.5% +/-.005abs

In general, the test plate tool is only as good as the tool is maintained. A dirty plate will provide data which reflects the debris on the glass. Keep the plate in its protective packaging.

The data given over 2.500abs is worth considering. Even though the performance in this area is unspecified, repeatability suffers first at the higher optical densities because the measurement signal is small. If a reader was repeatable at 2.800abs and then changes, it is a good indication of something changing. Production tolerances are a flat +/-5% variance between the standard and the actual data taken. This is almost never a problem although some 405nm filters have enough center band variance to produce differences of close to this magnitude in the 3.000abs area.

Verification of Performance Using Liquid Test Methods

The following sets of tests are valid methods of assuring instrument performance with common materials. These tests when done carefully can test repeatability, accuracy and linearity. It should be noted that unless good laboratory practice is applied to these tests they will be of little value.

The following equipment and process can be used to create a microplate for testing

Equipment Required

- Distilled water
- Pipette
- Yellow food coloring (Example: Durkee™ yellow food coloring, .3 oz. bottle)
- Flat-bottom micro plates (Example: Costar™ #3590)
- Tween™ 20 (polyoxyethylenesorbitan Monolaurate)
- Beakers
- Rack of 10 test tubes (10 ml minimum volume)

1. Create a 0.5% solution of Tween 20 and distilled water. As an example, add 1 ml of Tween 20 to 200 ml of distilled water. Shake well for several minutes.

2. Add 6 drops of yellow food coloring to the 200 ml of the 0.5% Tween solution. This should give an Absorbance of 1.4 to 2.0 Absorbance units when using 200 µl in the well. If you wish to attain an Absorbance up to 3.0 OD, add 3 additional drops of food coloring (a total of 9 drops). This solution should be read at 405nm in a 200 µl volume to verify that it actually absorbs as expected. Add more food coloring to increase the density or add distilled water to lower the density. 200 µl of this fluid should have a density which is the highest Absorbance to be tested.

3. Set up a rack containing 10 tubes, numbered consecutively. Perform a percentage dilution, beginning with 100% of the original dense solution in the first tube, 90% of the original solution in the second tube; 80% in the third tube, all the way to 10% in the last tube. Dilute using amounts of the remaining 0.5% solution of distilled water and Tween 20, as shown in Table 8-2.

Table 8-2
Test Tube Dilutions

Tube Number	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Volume of Original Solution (ml)	**20**	**18**	**16**	**14**	**12**	**10**	**8**	**6**	**4**	**2**
Vol. Water +0.5% Tween Solution (ml)	**0**	**2**	**4**	**6**	**8**	**10**	**12**	**14**	**16**	**18**
Expected Absorbance if original solution is 2.0 at 200 µl	**2.0**	**1.8**	**1.6**	**1.4**	**1.2**	**1.0**	**0.8**	**0.6**	**0.4**	**0.2**
Concentration	**1**	**.9**	**.8**	**.7**	**.6**	**.5**	**.4**	**.3**	**.2**	**.1**

4. Remove 200 µl of liquid from each tube, and dispense it into the appropriate microplate well. There should be enough solution to have several replicates, if desired.

Note: A variation on this method can be done right in the microplate instead of using test tubes. Simply use an 8 channel gang pipette to pipette the distilled water directly into the wells, then change the tips and dispense the absorber directly into the wells. This method allows 12 different concentrations across a 8 X 12 plate. The same pipette should be used for all pipetting to eliminate errors from two different pipettes. A 25µl-200 µl pipette will easily allow concentrations of 1 to 0 in .125 steps to be created right in the microplate.

Distilled Water Vol.	200	175	150	125	100	75	50	25	0
Absorber Vol.	0	25	50	75	100	125	150	175	200
Concentration	0	.125	.25	.375	.5	.625	.75	.875	1

5. Allow the plate to stabilize for about 10 minutes covered (orbital shaking helps). The plate is now ready to read in the reader at 405nm. One or all of the following tests can be run with the prepared plate.

Repeatability (specification +/-5%+/-.005abs) @ 405nm to 2.00abs

1. Read the microplate using a single wavelength, no blanking (or blank on air), and an 8 x 12 matrix format.

2. When the readings have printed out, read the microplate a second time.

3. Compare the readings.

Each well in the first printout should be within +/-0.5% +/-.005abs of the of the same reading in the second printout.

For example, A1 in the first printout should be within +/-.5% +/-.005abs of A1 in the second printout. If A1 was initially 1.000 OD, then subsequent readings should be between .990 OD and 1.010.

Alignment test (specification +/-1%+/-.010) @ 405nm to 2.00abs

1. Turn the microplate described in the Repeatability section around and read it again.

2. Compare the printout with the last printout from the repeatability test.

Be sure to compare the readings from the same wells. Remember that well A1 is now in the H12 position. The readings should be within 1% of the OD., and 0.010 counts of each other.

For example, if A1 was initially 1.000, then the "turn-around" test should show results in the H12 position of between .980 OD and 1.020 OD.

Linearity & Accuracy Test (+/-1%+/-.010) @405nm to 2.00abs

1. Read the microplate using a single wavelength (405nm if yellow dye is used), blank on the 0 concentration column (or blank on air), and an 8 x 12 matrix format.

2. When the data has printed out graph the Absorbance verses the concentration. The data should produce a straight line. The graph can be done manually or the data can be imported in to a spread sheet program and graphed with a computer. When using a spread sheet program a theoretical best fit line can be derived from the data using a least squares linear regression. This theoretical line can have the instruments linearity specification applied to it to derive a set of limits which the original data should fall with in.

3. Data which produces a flat line which rolls off above 2.00 abs is normal. Data which produces a flat line which rolls off under 2.00 abs indicates nonlinear instrument performance. In the event that nonlinear data is produced, the whole test should be run again to verify the results. If possible, the data should be checked on a similar instrument to make sure that the problem is

in the reader and not the solutions being measured. It should be noted that nonlinear response could be caused by one or more of the following things.

- Very strong ambient light sources shining into the carrier top case opening.
- Weak bulb. This should be flagged by a run time self check error.
- Use of a filter outside of the instruments specified operation range.

Software Configuration Verification

With the introduction of Assay definitions downloaded from a PC the need for determining if the assays loaded are the ones which we really want in the version of the *ELx800* we are setting up. If a foreign language was downloaded, the display should now reflect the appropriate language.

From the UUT Main Menu, press the **Util** soft key. Press the **Tests** soft key, then press the **Chksum** key. A revision level and part number will appear on the display, as will the code checksum. Compare these against 7330202-SP version and checksum. On the second display, version and part number of assay/config download will be displayed. They should match 733XXXX-SP version number. Refer to the BOM for proper -SP. Record the versions and revisions and checksums on the data sheet.

Instrument Setup

Setting DATE / TIME

Compare the displayed time and date to the correct time and date. If they are correct skip this step and go to Step 5. If they are wrong, they must be set.

To set the time, press the following soft keys just below the display of the UUT:

- ➡ **Press the UTIL soft key.**
- ➡ **Press the SETUP soft key.**
- ➡ **Press the TIME soft key.**
- ➡ **Press the 12HOUR soft key.**

Use the numeric keys on the UUT to set the time. Press **ENTER** when the date is input.

To set the **DATE**, press the following soft keys just below the display of the UUT:

- ➡ **Press the DATE soft key.**
- ➡ **Press the MMDDYY soft key.**

Use the numeric keys on the UUT to set the date. Press **ENTER** and then the **MAIN MENU** key when the date is input. The Main Menu should display the correct time.

Time Check

Make a note of the time at this point in the process. The system clock is now set and should keep time correctly. At the end of the procedure we will look again at the time and make sure that it is correct.

Filter Table Setup

The unit, as downloaded, will have a set of default filter values programmed in its internal filter table. They are as follows:

POS 1	405
POS 2	450
POS 3	490
POS 4	630
POS 5	000 or (340 in UV instruments)

If the filters installed are different than the default values in the filter table, the instruments memory will need modification. Follow the instructions below to verify or modify the table. From the Main Menu screen:

- ➡ Press **UTIL**
- ➡ Press **SETUP**
- ➡ Press **FILTER**

Use the "Numeric keys" to modify the value, or press **ENTER** to select the displayed value and move to the next filter value. After all 5 locations have been verified, press the **MAIN MENU** key to get back to the Main Menu.

Time Verification

Check the time displayed at the Main Menu. It should match whatever clock the instrument was set to. Verify that the times printed on the Data Sheets accurately indicate the time elapsed between tests. Make a Data Sheet entry.

C O N F I D E N T I A L

Bio-Tek Instruments, Inc.

Model: **ELx800 and Variations**

Procedure: **7330005-ST**

Title: **Final Asby Service Test Procedure**

Rev	Description of changes	ECO	Date
A	Release To Production	29167	04/30/97
B	Added blank carrier, changed gain	30814	07/09/98

Equipment Required

Bleach
IBM compatible computer
KCJR, KC3 or equivalent
Serial cable (P/N 75053) or equivalent
Parallel cable (P/N 71072) or equivalent
Parallel printer
Calibration plate (P/N 9000547)
Auto cal jig (P/N 7332508)
Shipping accessories:
- Screws qty 2 (P/N 19337) or equivalent
- Stopping block (P/N 7332041)
- Rubber band (P/N 99204) or equivalent
- Screw driver (P/N 98145) or equivalent
- Bunge cord (P/N 49746) or equivalent
- Shipping document (P/N 7331006)
- Lab tape

Operators Manual (P/N 7331000)
Service Manual (P/N 7331005)
Final assembly data sheet (P/N 7330005-DS)
Field software download procedure (P/N 8291007)

Procedure

1. Perform the decontamination procedure in the Operators manual (Appendix A).

2. List all accessories sent with unit. If unit was not shipped with all the shipping accessories, list discrepancies on IR.

3. At the main menu select "**Util**", "**Tests**", then "**CHKSUM**". Record the Base code and Assays. The EPROM is displayed on power up.

4. Remove the top cover. Remove the cover over the filter wheel. Remove the filter wheel. **Do not turn over or use fingers.** Gently push up the filters to reveal the filter designations. Record the filter wavelengths. Reinstall the removed items.
5.
6. At the main menu select "**Util**", "**Setup**", then "**Filter**". Record the programmed filter locations.

7. At the main menu select "**Util**", "**Setup**", "**More**", then "**RS232**". Record the Baud rate.

8. At the main menu select "**Util**", "**Output**". Record the output status.

9. Perform a self test. Refer to the operators manual and the service manual for directions.

10. Perform a calibration test at 405nm. Refer to the operators manual and the service manual for directions.

11. Skip this test if their is no reported problems.

12. Perform the cleaning section of the Service Manual. In addition to the manual, use lens paper to clean the lower lens on the base assembly. Use NOVUS Plastic polish #2 to clean the rails.

    Perform the carrier alignment and the optic arm alignment steps within the service manual.

    Perform the bulb alignment with in the Operators Manual. If more than 10% of the circular light beam is blocked out, and can not be adjusted, replace lamp.

13. Conduct necessary repairs.

14. Perform all FCN's

15. Check all the hardware for tightness. Replace broken, rusted, or missing parts.

16. If downloading is not required skip this step, otherwise perform 8291007-AW.

    To find the Download Utility version, start the Download utility. Pull down the "**?**". This will reveal the Download Utility version. The part number and revision are found on the Download Utility diskettes. Verify current revision with document control, or ISIS.

    The new base code and assay part numbers, revisions and versions are found on the diskettes. Verify current revision with document control, or ISIS.

17. Perform the auto cal section of the Service Manual.

18. Repeat steps 6 and 7 of this procedure.

19. Use the operators manual to perform this step. Computer control is optional.

20. Verify serial port performance. Task the reader to perform a read and send data back to the IBM compatible computer. Use Appendix B in the Operators Manual to guide you.

21. Set serial port and computer controlled parameters back to original settings.

22. Ensure all accessories noted are sent back with unit.

    For BTI demo units, complete the demo checklist.

23. When service has been completed, install the shipping accessories described by the shipping instruction document 7331006. Use Lab tape, to tape the screwdriver and instructions onto the instrument.

This completes the service procedure.

C O N F I D E N T I A L

Bio-Tek Instruments, Inc.

Model: **ELx800 and Variations**

Procedure: **7330005-SD**

Title: **Final Asby Service Data Sheet**

Rev	Description of changes	ECO	Date
A	Release To Production	29167	04/30/97
B	Added blank carrier, changed gain	30814	07/09/98

Technician: _____ Date: _____

Model: _____ Serial#: _____ IR: _____

1. Decontaminate unit and tag to indicate status.(√)_____

2. List accessories: _____
   _____
   _____

3. Record the following before servicing:

   Base Code _____Ver_____ EPROM _____

   Assay _____Ver_____

4. Filter locations: W1_____W2_____ W3_____ W4_____W5_____

   Programmed: W1_____W2_____ W3_____ W4_____W5_____

5. Record serial port parameters. **1200 2400 9600**
   Record the report output status **Print Computer Both**

   Note: For any of the following steps, attach all printouts to IR.

6. Perform a self test.

   See the 7330005-DS for the self test **PASS / FAIL** criteria's.

   Does the instruments PASS? **yes / no**
   If **No** do not fix at this time, report discrepancies on IR.

7. Calibration Plate Test:

   See the 7330005-DS for the calibration plate **PASS / FAIL** criteria's.

   Does the instrument PASS? **yes / no**
   If **No** do not fix at this time, report discrepancies on IR.

8. Duplicate customers complaint.
   If **No** Contact customer and/or Service Engineer.

   Was the complaint duplicated? **yes / no**

9. Clean mechanical and optical assemblies.
   Align if necessary.

   Was any of the alignments changed? **yes / no**

10. Conduct necessary repairs.

    Was any repairs performed? **yes / no**

11. Perform all FCN's (√)_____

12. Check all the hardware for tightness. Replace broken, rusted, or missing parts. (√)_

13. If customer approves or if the software is required to be updated, Record the new software. Otherwise skip this step.

    Download utility _____ Ver_____

    Base Code _____ Ver_____

    Assay _____ Ver_____

14. Perform Auto cal.

    See the 7330005-DS for the auto cal **PASS / FAIL** criteria's.

    Does the unit pass Auto cal? **yes / no**

15. Repeat steps 6 and 7.

    Does the unit pass both steps? **yes / no**

16. Perform the following with all the filters received with the instrument:

Blank carrier test >= 405nm	See 7330005-DS for specs.
Blank carrier test < 405nm	0.000 ± 0.003
Accuracy test >= 405nm	See operators manual for specs
Repeatability test >= 405nm	See operators manual for specs
Turnaround test 1% ± 0.010	

Do all the filters pass? **yes / no**

17. If step 16 was not performed with an external computer, perform a read using an external computer. Other wise skip this step.

Does the unit pass this step? **yes / no**

18. Set serial port and computer controlled parameters to original settings. See step 5. (√)_

19. Ensure all accessories noted accompany unit. (For BTI demo units, complete demo checklist.) (√)_

20. Install the following shipping accessories.

Stopping block	(P/N 7332041)
Screws qty 2	(P/N 19337) or equivalent
Rubber band	(P/N 99204) or equivalent
Screw driver	(P/N 98145) or equivalent
Bunge cord	(P/N 49746) or equivalent
Shipping document	(P/N 7331006)

Are all the shipping accessories installed? **yes / no**

21. This is the end of the data sheet.

ELx800 Data Sheet

Technician:_____Date:_____

Model:_____Serial#:_____IR#_____

Section 1 Alignment/Setup:

Revision EPROM _____(marked on U37 and U52 on main PCB)
Optics Aligned _____
Bulb Aligned _____

Pos	Filter
1	_____
2	_____
3	_____
4	_____
5	_____

Section 2 Download/Testing:

Base Code Loaded_____REV_____VER_____

Assay Definition Loaded_____REV____VER_____

TIME CHECK

PASSED_____

Self Check:

Printed gain values must be over 1.70 for all filters installed.

405nm gain values must not exceed 20.00. 340nm System Test AIR less DARK must be more than 16000** Noise Signal range (difference between two numbers) must be less than 12 counts. Both Noise Signal range numbers must be between 288-1875.

NOTE: ** Only UV instruments

PASSED _____

AUTO CAL:

Each Printed Delta must be +/- 32 counts for shipment

Delta 1 = _____ Delta 3 = _____ **PASSED** _____
Delta 2 = _____ Delta 4 = _____

Calibration Plate Test

Alignment values must be under .008 counts for shipment

Note: Printout may indicate "PASS" even though Unit fails this Specification

B2 = _____ G1 = _____ **PASSED** _____
B12 = _____ G11 = _____

SHIPPING PREP

Shipping Block installed _____

Top Shroud & Bottom pan installed _____

Rubber Band & Shock cord installed _____

Instructions and tool attached per print _____

Download

Bio-Tek Instruments, Inc.

Model: *ELx800*, ELx808 and all variations of each.

Procedure: 8290206-ST

Title: Field Software Download Procedure

Rev	Description of changes	ECO	Date
A	Release to Production	27679	07/16/96

Equipment Required

- A PC (386) with a 1.44 MB 3.5" floppy drive, 1 COM port (minimum), mouse and 4 MB RAM
- Windows 3.1 or Windows '95 installed on the above PC
- Serial Cable
- 8290206-FW Download Utility
- Reader Basecode and Assay Configuration Software Diskettes (see Background Information, below)

Background Information

Note: We may refer to the *ELx800* or ELx808 autoreaders as the "reader" throughout this procedure

The *ELx800* and ELx808 (all models) have two "levels" of software installed on board.

1) The *basecode* software and
2) The *assay configuration* software

All *ELx800* readers have the same *basecode* software, part number 7330202-FW.
All ELx808 readers have the same *basecode* software, part number 7340201-FW.

The *assay configuration* software part number is dependent on the model of the reader. See the attached software sheet for current part numbers. Contact Bio-Tek Instruments to obtain current software revisions and versions.

These two levels of software are loaded into the readers memory via a computer connected to the serial port of the reader. This procedure explains the process for downloading both the basecode and assay configuration software onto an *ELx800* or ELx808 reader. The basecode is downloaded first, followed by the assay configuration files.

Note: When updated software is downloaded onto the reader, any open assays that have been programmed on board the reader will be erased and will have to be re-programmed. Please print the assay definitions before downloading new software. To do this, attach a printer to the parallel port of the reader, choose REPORT from the main menu on the reader, then press ASSAY and choose the programmed assay definition to print. This printout will detail all assay parameters, *except* any formulas which may have been defined. (The formulas are printed as part of the assay results report printout; refer to a hardcopy of an assay results report, or step through the define formula section from the front keypad to obtain the formula definition).

Procedure

1. Connect the reader **serial port** to the computer **COM port**, using the 75053 cable.(*If your computer has a 25-pin COM port, it will be necessary to attach a 9-pin to 25-pin adapter to the computer end of the cable).*

2. Turn the computer and reader ON.

3. Basecode Download:

    - Insert the basecode software diskette (7330202-FW or 7340202-FW) into the computer's floppy drive.

    - Get to the DOS a:\> prompt (or appropriate floppy drive prompt).

    - On the reader, press the **Shift** and **Hidden Key #1** *simultaneously*. (Hidden key #1 is between the 'CLEAR' and 'ENTER' keys).

    - The reader display should read **"START CODE DOWNLOAD?"**
      YES NO

IMPORTANT: To properly load the basecode software, the above message MUST BE displayed on the reader. If "START ASSAY DOWNLOAD" is displayed, press NO and repeat step 3.2, making certain that the correct Hidden Key is pressed.

    - Select **YES**. The reader display will read **Clearing Download Area**, then **Ready for Download**.

- At the computer DOS prompt, type **DLOAD** and press **Return** . The reader display will read **DOWNLOAD IN PROGRESS**.

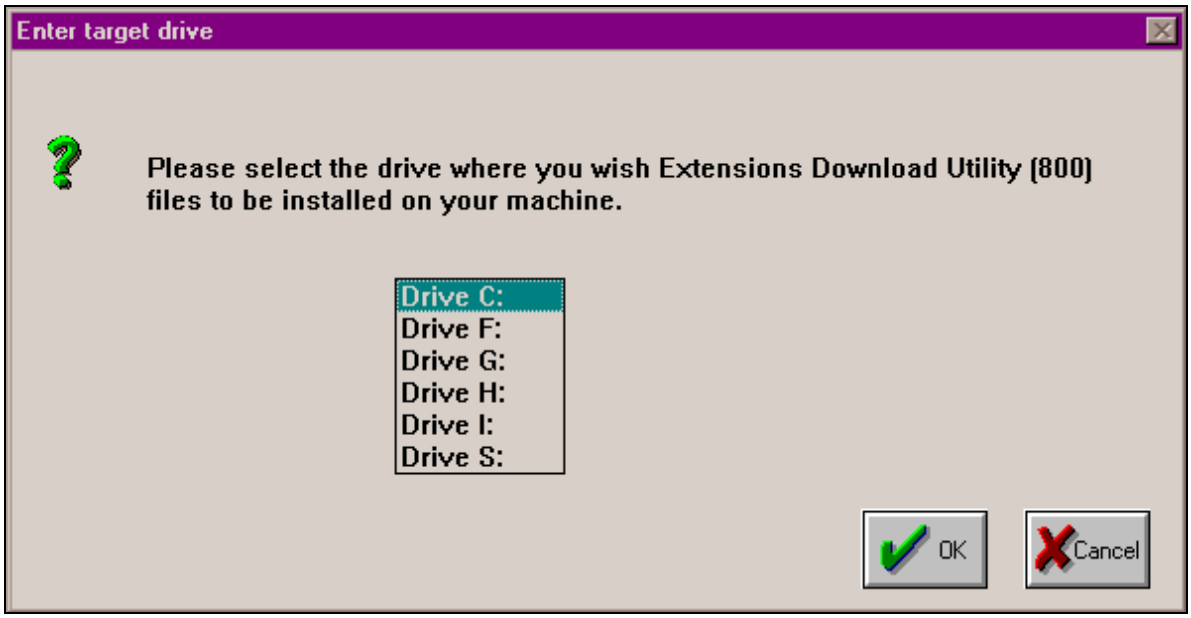
- The computer will display: **File size: 3000513 (may vary)**
  Bytes sent: xxxxxx (will be counting up)

- The download will take several minutes. When complete, the computer will display **DOWNLOAD SUCCESSFUL!** The reader will display **START ASSAY DOWNLOAD**, which indicates that the assay configuration files must now be downloaded. Remove the basecode diskette from the floppy drive.

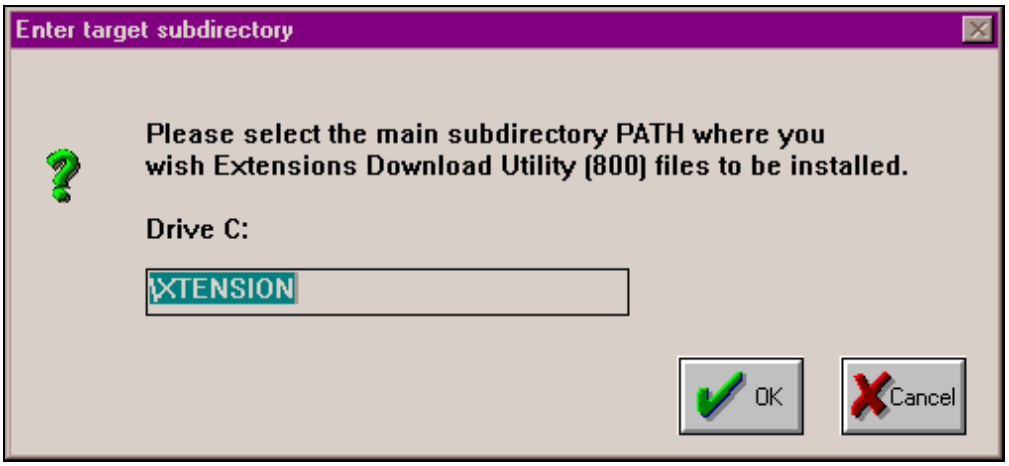
4. **ASSAY CONFIGURATION DOWNLOAD-** This download is performed using the Download Utility Program, part number 8290206-FW. Start Windows 3.1 or Windows '95 on the computer.

   - Install the Download Utility via File Manager or Windows Explore.(Double click on the Download Utility's ***Winstall.exe*** file)

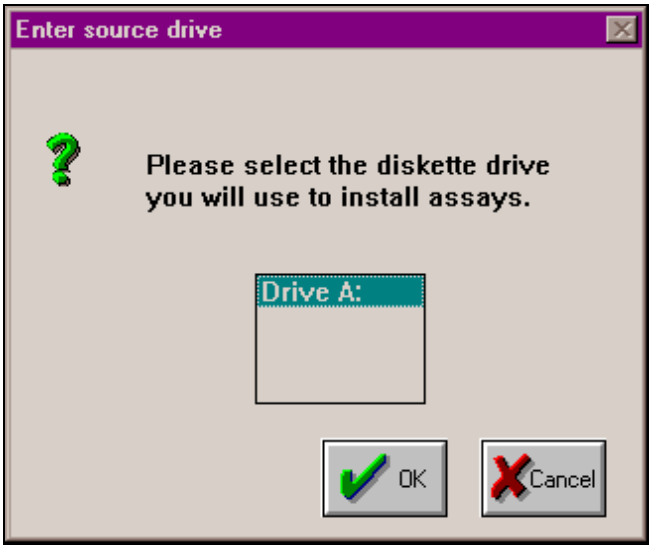
   - The install program will ask several questions - it is highly recommended that the user accept all the default settings in the installation process. Once the Winstall.exe is begun, you will see screens similar to those shown below:



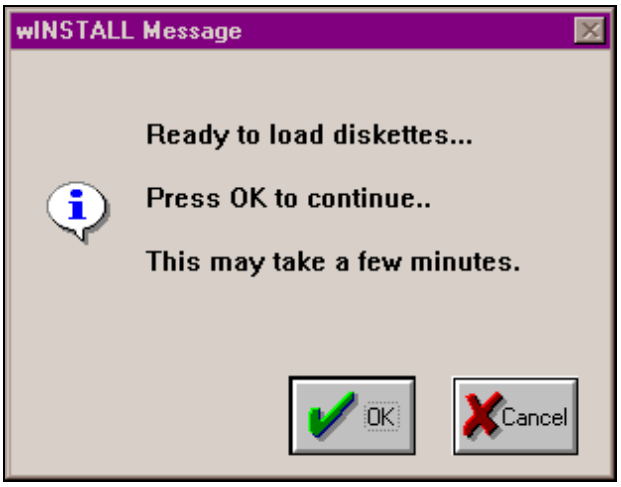
   - Select C: to install the Download Utility onto hard drive C:


Enter target subdirectory
Please select the main subdirectory PATH where you wish Extensions Download Utility (800) files to be installed.
Drive C:
\XTENSION
OK
Cancel

The Download Utility will be installed in subdirectory C:\XTENSION, unless a different subdirectory name is entered.

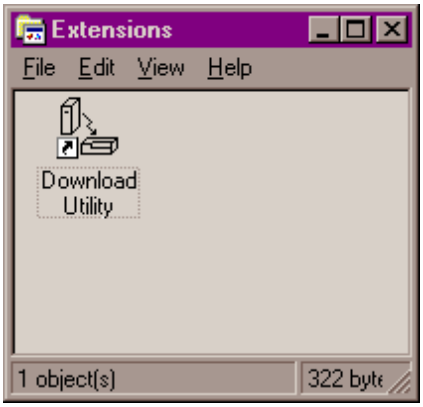


The assay configuration files will be installed from a floppy diskette in drive a: (other floppy drive designators may be available at this screen). It is recommended that the assay configuration files be loaded from a floppy drive.

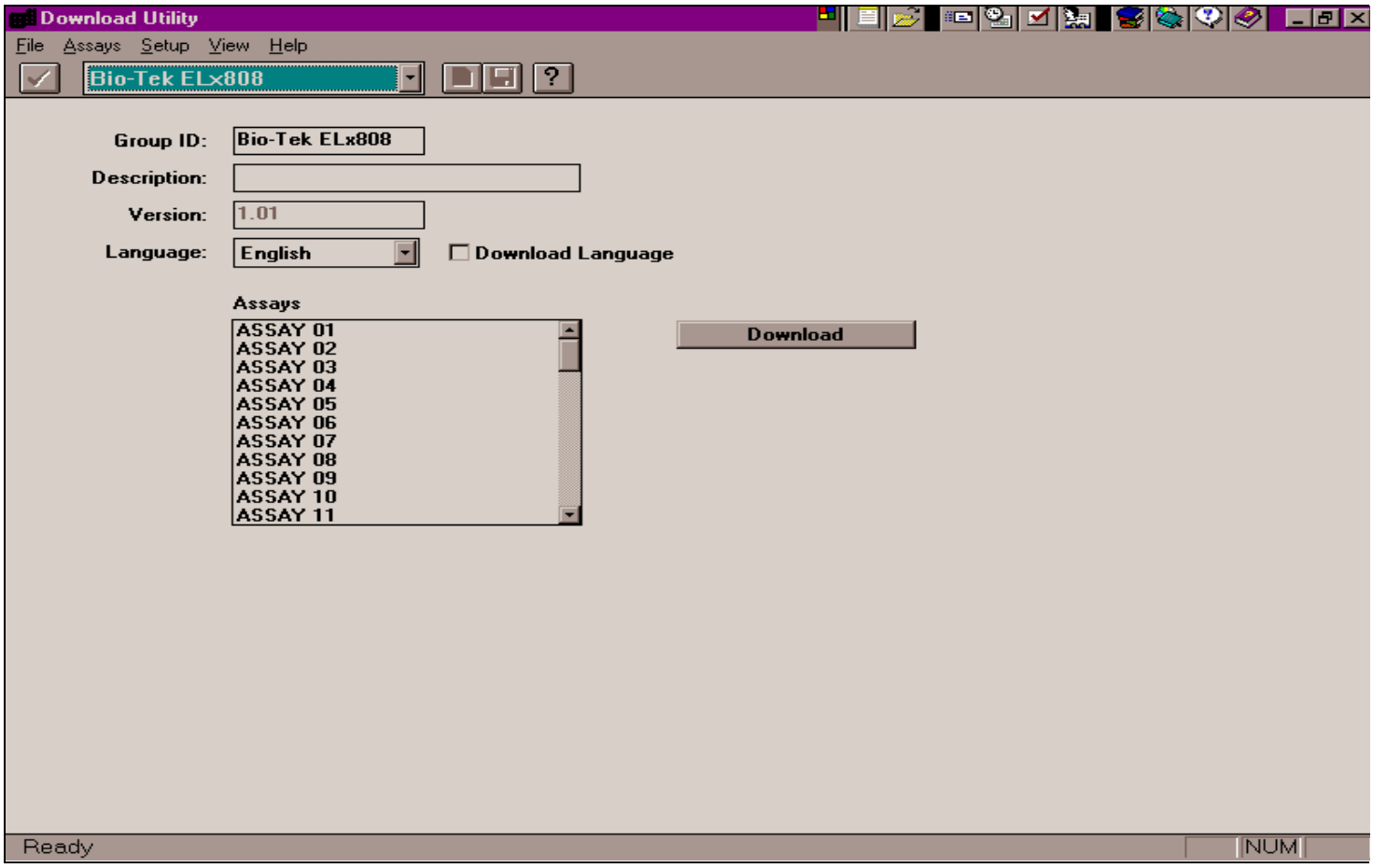


- The Download Utility files are being loaded. In most cases, there is only one Download Utility disk.

- When the installation of the Utility is complete, an ICON similar to the icon below will be seen in Windows 3.1 or Windows '95. Remove the Download Utility diskette from the computer's floppy drive and insert the appropriate ASSAY CONFIGURATION diskette into the floppy drive.



- The reader display should still read **START ASSAY DOWNLOAD**. Double click on the Download Utility Icon. The floppy drive should become active while the application is initializing. The following screen (or similar) should appear on the computer:



- The Group ID will be either *ELx800* or *ELx808*, depending on the Assay Configuration software being installed. The assay names may vary as well, if the Assay Configuration files have been customized by Bio-Tek. For most users, the assay names will appear as Assay 01- Assay 55.

- Select the **DOWNLOAD** button. The Assay Configuration download will begin. If the reader and computer are not properly connected, or if the reader display does not read **Start Assay Download**, the following message window may appear:

Define Assay Download
Unable to start the download sequence
Error: Message Receive Error.
Check that the reader is ready for download and that the proper cable is being used.
OK

- √ Check that the cable is connected between the computer and the SERIAL port of the reader.
- √ It may be necessary to check/change the configuration of the serial port in the Download Utility (under Setup - Serial Port).

If the reader does *not* display **Start Assay Download**, press the **Shift** and **Hidden Key #**2 *simultaneously* (Hidden Key #2 is between the 'Main Menu' and 'Previous Screen' keys.). The reader should display :**START ASSAY DOWNLOAD?**

YES NO

Choose YES, then double click on the **DOWNLOAD** button in the Download Utility and start the process again. After the assay configuration download is complete, the reader will re-initialize and return to the Main Menu. Check that the current software is loaded onto the reader by pressing **UTIL, TEST, CHKSUM**. The reader display will scroll through the seven digit part numbers and versions of both the basecode and assay configuration part numbers. Check them against the list at the end of this procedure. The software update is complete **.**

SOFTWARE PART NUMBER LIST

Proprietary *ELx800*, ELx808 Software Information

	Basecode P/N	**Assay Config P/N**
ELx800	7330202-FW	7330203-FW
*ELx800*NB	7330202-FW	7330209-FW
*ELx800*UV	7330202-FW	7330208-FW
*ELx800*G	7330202-FW	7330211-FW
ELx808	7340201-FW	7340202-FW
ELx808R	7340201-FW	7340202-FW
ELx808I	7340201-FW	7340202-FW
ELx808RI	7340201-FW	7340202-FW
ELx808U	7340201-FW	7340202-FW
ELx808RU	7340201-FW	7340203-FW
ELx808RIU	7340201-FW	7340203-FW
ELx808IU	7340201-FW	7340203-FW
ELx808GU	7340201-FW	7340207-FW
ELx808GIU	7340201-FW	7340207-FW
ELx808G	7340201-FW	7340208-FW
ELx808GI	7340201-FW	7340208-FW

Drawings/Bill of Materials for Main Board with Photodiodes

Assembly Drawings

The following drawings are the assembly documentation used to assemble the *ELx800* and its variations. These drawings are subject to change.

7330005-AS FINAL ASBY

Schematic Diagrams

The following are the schematic diagrams describing the electrical circuits within the *ELx800* and its variations. These are subject to change.

7330400-SC MAIN PCB ASBY

Bill of Materials

The following are the bills of material used in building the *ELx800* and its variations. These documents are also subject to change.

7330002	Shipping accessories
7330005	Final assembly
7330400	Main PCB assembly

BILL OF MATERIALS REPORT

PART: 7330002
DESC: SHIPPING ACCESSORIES
29-Jun-1995
Page 1

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
7331000	1.00	OPERATOR'S MANUAL *ELX800*	A	
94075	1.00	SHIPPING DOCUMENT KIT	C	

BILL OF MATERIALS REPORT

PART: 7330005
DESC: FINAL ASBY
29-Jun-1995
Page 2

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
2872086	1.00	DUMMY FILTER	B	IN POSITION 5
2874405	1.00	FILTER ASBY 405NM READER	C	IN POSITION 1
2874450	1.00	FILTER ASBY 450NM READER	B	IN POSITION 2
2874490	1.00	490NM READER FILTER ASBY	B	IN POSITION 3
2874630	1.00	FILTER ASBY 630NM READER	B	IN POSITION 4
49767	1.00	STRAP W/BUCKLE 6FT LONG 1.5"W	A	
7330005-AS	0.00	FINAL ASBY	F	DOCUMENT ONLY
7330005-TP	0.00	FINAL ASBY		DOCUMENT ONLY
7330400	1.00	MAIN PCB ASBY	G	
7330500	1.00	GENERIC FINAL KIT	F	
7330512	1.00	OPTIC ARM ASBY	B	
7330515	1.00	CARRIER ASBY	A	
7331001	1.00	OVRLY KEYBOARD X-Y READER	C	
7331003	1.00	OVRLY FRONT	A	
7331006	1.00	LABEL UNPACKING INSTRUCTIONS	A	
7332009	1.00	COVER TOP	G	
7332030	1.00	PLATE BASE PAINTED	D	
7332034	1.00	SHIPPING BOX END CAPS SHELF	D	
7770102	1.00	LABEL "FCC COMPLIANCE"	A	Installed by QC
7770107	1.00	TAG S/N (AW)	D	Installed by QC
7771009	1.00	LABEL CE MARK	A	Installed by QC
7771010	1.00	LABEL ETL UL CSA 1010.1 LISTED	A	Installed by QC
9001018	1.00	LABEL IN-VITRO DIAG USE	A	Installed by QC
91046	0.00	BUBBLE PACK MED 24"W	A	A/R

BILL OF MATERIALS REPORT

PART: 7330400
DESC: MAIN PCB ASBY
29-Jun-1995
Page 3

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
04018	1.00	LCD 2X24 SUPERTWIST DISPLAY	B	[DSP1]
12089	4.00	SCR PAN 2-56X1/4 SS PHIL	A	
16001	4.00	LKWSHR #2 HELICAL SPR	A	
21010	3.00	DIODE IN5821 SCHOTTKY 30V 1/4W	A	CR1 CR3 CR4
23013	2.00	OP AMP LT1012CN8 SINGLE	B	U18 19
23021	1.00	VOLT REG +ADJ 1.5A 317	B	U5
23026	1.00	VOLT REG +5V 78L05A	A	U7
23029	1.00	VOLT REG -5V 79L05	A	U6
23072	1.00	VOLT REG LM2575T	C	U1
23092	1.00	VOLT REG ADJ LM2576 SWITCHER	A	U2
25027	2.00	IC 74HC595 SHIFT REG 8BIT 3ST	B	U13 14
25051	1.00	IC 74LS04 HEX INVERTER	C	U41
25084	2.00	IC 74HC541 TS OCTAL BFR NONINV	D	U23 43
25086	5.00	IC 74HC574 OCTAL D FLIP-FLOP	C	U20 21 26 44 45
25094	1.00	IC L7662CPA NEG CONVERTER	B	U4
25106	1.00	IC 74AC245 OCTAL TRANSCEIVER	E	U22
25107	2.00	IC 74AC32 QUAD 2-INPUT OR GATE	D	U16 42
25108	1.00	IC LT1017CN8 COMPARATOR	A	U60
25114	1.00	IC LT1080 RS232 DRU/RECEIVER	A	U8
25130	3.00	IC 74AC373 OCTAL LATCH	A	U31-33
25131	1.00	IC 74AC08 QUAD 2-INPUT AND	A	U15
25132	2.00	IC 74AC138 1 OF 8 DECODER	A	U47 48
25133	1.00	IC CS5102 A/D 16BIT	A	U9
25135	1.00	IC 80C186-20 UP PLCC	B	[U30]
25136	1.00	IC DS1233-10 ECONO RESET	A	U29
28004	1.00	VOLT REF 2.5	B	U27
28043	1.00	VOLT REF 1.2 LT1004 +/-4MV	B	CR5
28058	1.00	TRANS ARRAY 2003 DARL 5V	A	U11
28064	3.00	IC STEPPER MOTOR DRIVER	B	U25 39 54
28073	1.00	IC DS1215 TIME CHIP	A	U40

		PHANTOM		
28115	1.00	OP AMP TL072	A	U12
28116	1.00	VOLT REF 5V LT1021	A	U10
29002	1.00	IC 7523 8-BIT D-A CONVERT	A	U17
29084	3.00	IC D/A DUAL 7 BIT	C	U24 38 53
29106	2.00	IC 128KX8 CMOS STATIC RAM	D	U36 51
29130	2.00	IC AM29F040-120 512K FLSH MEM	A	U34 49
29131	1.00	TRANSZORB 33V 1.5KE33A	A	CR2
29132	2.00	IC FLASH MEM 128KX8	A	U50 35
31300	6.00	RES 30.0 OHM 5% 1/4W	A	R51 52 53 54 55 56
32028	1.00	RES 49.90K OHM 1% 1/4W	A	R24
32039	1.00	RES 1.00M OHM 1% 1/4W	A	R14
32042	1.00	RES 10.00K OHM 1% 1/4W	A	R65
32044	2.00	RES 20.00K OHM 1% 1/4W	A	R19 22
32047	8.00	RES 1.000K OHM 1% 1/4W	A	R1 17 33 34 39 40 45
32052	2.00	RES 2.00M OHM 1% 1/4W	A	R29 30
32085	4.00	RES 15.00K OHM 1% 1/4W	A	R28 41 42 50
32099	2.00	RES 10.00 OHM 1% 1/4W	A	R10 11
32112	3.00	RES 2.00K OHM 1% 1/4W	A	R21 R23 R63
32113	1.00	RES 4.02K OHM 1% 1/4W	A	R16
32126	2.00	RES 1.870K OHM 1% 1/4W	A	R4 9

BILL OF MATERIALS REPORT

PART: 7330400
DESC: MAIN PCB ASBY
29-Jun-1995
Page 4

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
32140	1.00	RES 6.19K OHM 1% 1/4W	A	R18
32158	1.00	RES 2.49M OHM 1% 1/4W	A	R62
32195	4.00	RES 22.10 OHM 1% 1/4W	A	R12 13 25 49
32228	1.00	RES 3.83K OHM 1% 1/4W	A	R3
32232	8.00	RES 200.00OHM 1% 1/4W	A	R6-8 15 20 26 27 66
32296	1.00	RES 3.32K 1% 1/4W	A	R2
33047	6.00	RES 1.00 OHM 1% 1W	A	R31 36-38 43 48
35009	1.00	TRIMPOT 20K 25T	A	RT1
37002	4.00	RESNET 10K OHM 5R 6P SIP	A	RN5-7 13
37007	3.00	RESNET 180 OHM 5R 10P SIP	A	RN2-4
37046	6.00	RESNET 10K SIP 10PIN 9RES 5%	A	RN1 8-12
37094	1.00	RES 10.00K OHM .1% 1/4W 5PPM	A	R61
37101	1.00	RESONATOR 1.26MHZ CERAMIC	A	Y2
38062	1.00	RES 75 OHM 5% 1 WATT	B	R64
38063	1.00	RES 29.4K .1% 1/4W	A	R60
42150	1.00	HEDR 12-P .100 RTANG BRKS	A	J9
42171	1.00	CONN 5PIN .1 RT ANGL	A	J3
42225	1.00	HEDR 3-P .156 LOK	A	J1
42269	1.00	HEDR 26P DUAL ROW 0.100	A	J5
42310	1.00	HEDR 14PIN FOR LCD MOUNTING	A	[J10]
42311	1.00	HEDR 14PIN .1X.1 FOR LCD	A	[ ]
42332	3.00	HEDR 4-P .100 RTANG POLARIZED	B	J2 7 8
42552	1.00	CONN 12P .049 RT STR RLF	A	J6
46082	1.00	FUSE RESETABLE 5A PCB MNT	A	F1
47049	1.00	BATTERY 3V LITHIUM COIN	A	[BT1]
47050	1.00	BATTERY HOLDER 3V LITH COIN	A	[BT1 HOLDER]
49014	9.00	TERM PCB	B	TP1-9
49149	2.00	SOCKET IC 28-PIN DIP	B	SOCKET FOR U37 52
49478	1.00	SOCKET 84-PIN PLCC	A	SOCKET FOR U30
49694	1.00	HEDR 10P .1	A	J4
49741	1.00	CRYSTAL 32.768KHZ	A	Y1
49743	1.00	CRYSTAL CLOCK OSC 32 MHZ	A	U28
54005	1.00	SW DIP 4-SW SIDE-ACT	A	SW1
62027	1.00	FILTER EMI SUPPR .5-1GHZ	A	U3
63018	2.00	INDUCTOR 220UH	A	L1 2

65020	1.00	BUZZER 3-16V PIEZO	C	[BP1]
7330200	1.00	FIRMWARE ASBY	C	"HIGH" IN U52 "LOW" IN U37
7330400-AS	0.00	MAIN PCB ASBY	E	DOCUMENT ONLY
7330400-SC	0.00	MAIN PCB ASBY SCHEMATIC	D	DOCUMENT ONLY
7330505	1.00	PCB W/SWAGES ASBY	A	
81004	10.00	CAP 100 UF 63V ELEC	A	C1 3 4 7 18 19 61 64
81006	2.00	CAP 470 uF 10V ELEC	F	C2 5
81027	2.00	CAP 10000UF ELECTROLYTIC	A	C117 C118
82003	6.00	CAP 10 uF 25V TANT	C	C32 34 38 68 71 116
82005	18.00	CAP 1uF 35V TANT	D	C8 10-17 20 25 26 33 101 103 105
83021	1.00	CAP 1000 pF 200V DISC	A	C28
83023	3.00	CAP 100pF 200V DISC	A	C45 50 112
83049	4.00	CAP 33PF 100V CER	A	C113 C114 22 23

BILL OF MATERIALS REPORT

PART: 7330400
DESC: MAIN PCB ASBY
29-Jun-1995
Page 5

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
84003	1.00	CAP .068 uF 100V FILM	A	C43
84039	8.00	CAP 820 PF 200V 10% X7R	A	C6 37 58 60 82 84 10
84054	3.00	CAP .0033UF FILM	A	C57 85 86
85002	1.00	CAP .01 uF 100V 1%	D	C115
85024	60.00	CAP .1UF 50V CER	A	C9 21 24 27 29-31 35 44 46-49 51-56 59 62 69 70 72-81 83 87-92 102 104 106-108 119

Drawings/Bill of Materials for Main Board with Daughter Modules

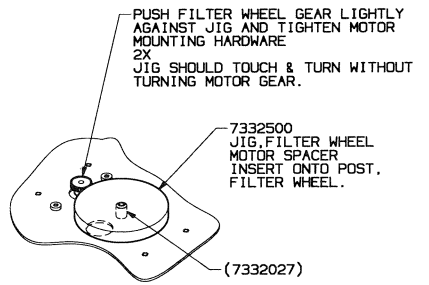
Assembly Drawings

The following drawings are the assembly documentation used to assemble the *ELx800* and its variations. These drawings are subject to change.

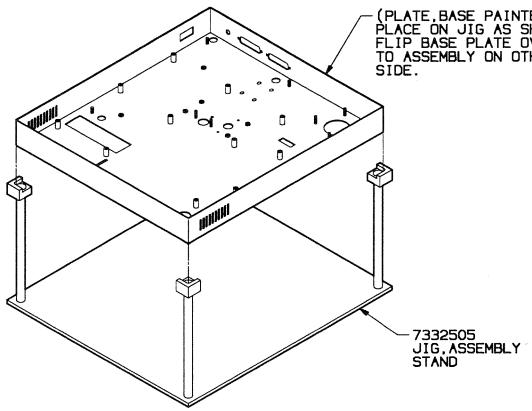
7330005-AS FINAL ASBY
7330410-AS MAIN PCB (Less front end)
7330415-AS MAIN PCB (New)
7330401-AS
7330404-AS
7330414-AS
7330413-AS
7330523-AS
7330524-AS
7330522-As
7330501-AS CABLE LAMP ASBY
7330502-AS CABLE MOTOR Y AXIS ASBY
7330503-AS CABLE POWER INPUT ASBY
7330504-AS CABLE LAMP EXTENSION ASBY
7330506-AS CABLE OPTO 14L ASBY
7330507-AS CABLE X AXIS MOTOR
7330508-AS MECH PRE ASSEMBLED ASBY
7330509-AS CABLE LAMP UV ASSEMBLY
8050509-AS CABLE FILTER WHEEL MOTOR ASBY

NOTES:

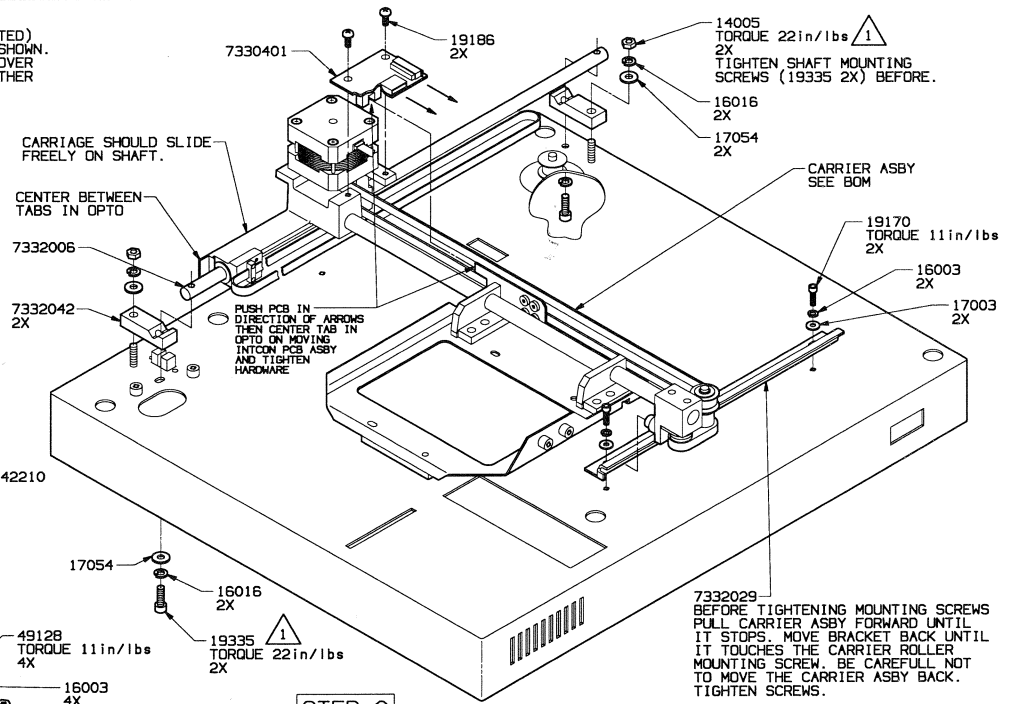
1. APPLY LOCTITE (66006) TO THREADS.
2. APPLY LOCTITE (66033) TO THREADS.
3. ORIENT CONNECTOR TO MATCH CUTOUT. DISCARD MOUNTING HARDWARE SUPPLIED & REPLACE WITH 42210. DISCARD UNUSED HARDWARE.


PUSH FILTER WHEEL GEAR LIGHTLY AGAINST JIG AND TIGHTEN MOTOR MOUNTING HARDWARE 2X
JIG SHOULD TOUCH & TURN WITHOUT TURNING MOTOR GEAR.
7332500 JIG,FILTER WHEEL MOTOR SPACER INSERT ONTO POST. FILTER WHEEL.
(7332027)

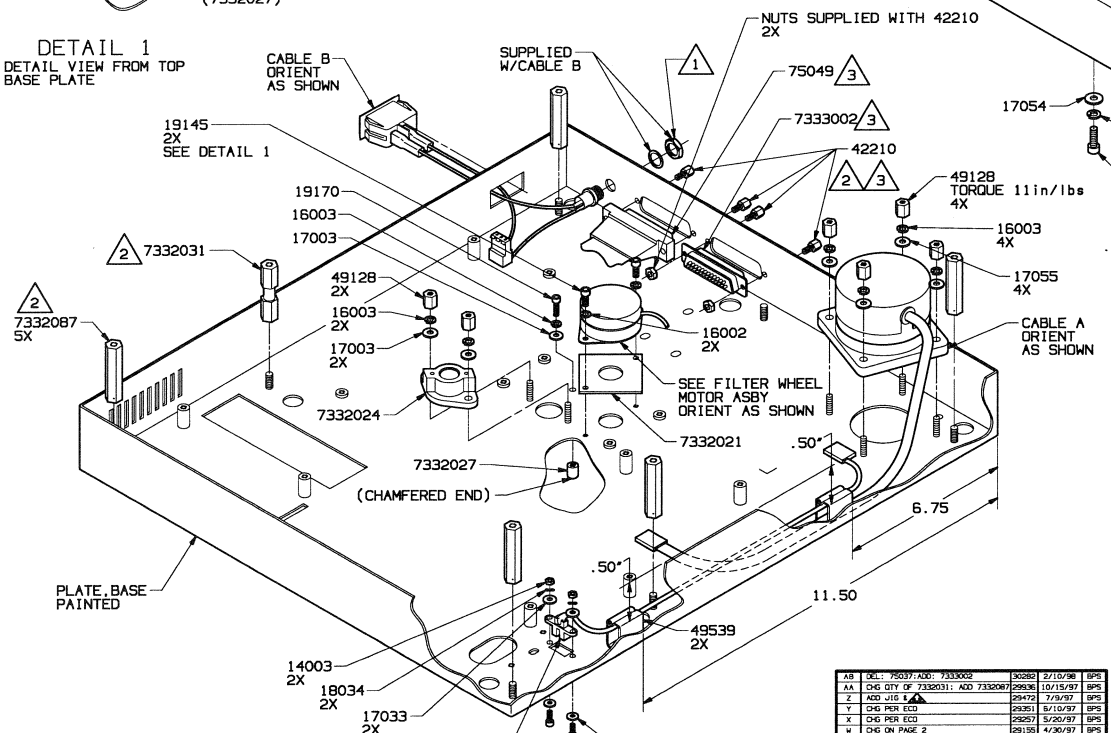
DETAIL 1
DETAIL VIEW FROM TOP BASE PLATE



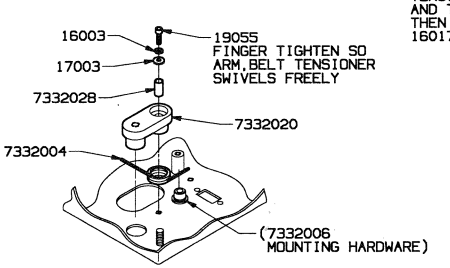
DETAIL 2


7330401
19186 2X
14005 TORQUE 22in/lbs 1 2X TIGHTEN SHAFT MOUNTING SCREWS (19335 2X) BEFORE.
16016 2X
17054 2X
CARRIAGE SHOULD SLIDE FREELY ON SHAFT.
CARRIER ASBY SEE BOM
CENTER BETWEEN TABS IN OPTO
19170 TORQUE 11in/lbs 2X
7332006
16003 2X
7332042 2X
17003 2X
PUSH PCB IN DIRECTION OF ARROWS THEN CENTER TAB IN OPTO ON MOVING INTCOM PCB ASBY AND TIGHTEN HARDWARE
17054
16016 2X
19335 1 TORQUE 22in/lbs 2X
7332029 BEFORE TIGHTENING MOUNTING SCREWS PULL CARRIER ASBY FORWARD UNTIL IT STOPS. MOVE BRACKET BACK UNTIL IT TOUCHES THE CARRIER ROLLER MOUNTING SCREW. BE CAREFULL NOT TO MOVE THE CARRIER ASBY BACK. TIGHTEN SCREWS.

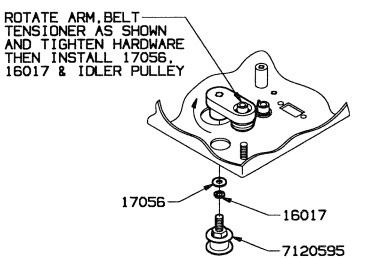
STEP 2



STEP 1
SEE DETAIL 2 FOR USE OF ASSEMBLY JIG



STEP 3
VIEWED FROM BOTTOM



STEP 4

REV	DESCRIPTION	ECO	DATE	BY
AB	DEL: 75037;ADD: 7330022	30282	2/10/98	BPS
AA	CHG QTY OF 7332031; ADD 7332087	29936	10/15/97	BPS
Z	ADD JIG 5	29472	7/9/97	BPS
Y	CHG PER ECO	29351	6/10/97	BPS
X	CHG PER ECO	29257	5/20/97	BPS
W	CHG ON PAGE 2	29155	4/30/97	BPS
V	CLEARLY DEFINE MOUNTING INSTRUC	28719	2/11/97	BPS
U	SHT 1 & 4 AFFECTED	28642	1/23/97	PEB
T	STEP 1:ADD TWO NYLON WASHERS	28508	12/16/96	BPS
S	ADD: 18038; CHG QTY OF 19186	27765	7/29/96	PEB
R	SHT 2: CHG PER ECO	27652	6/21/96	PEB
Q	ADD TO NOTE 5.5	27378	4/2/96	BPS
P	SHEETS 1 & 2 AFFECTED	27284	3/8/96	BPS
O	SHEET 1,2 & 6 AFFECTED	27211	2/13/96	BPS

REV	DESCRIPTION	ECO	DATE	BY
N	CHG PER ECO	27183	2/5/96	BPS
M	CHG PER ECO	27085	1/12/96	BPS
L	CHG PER ECO	26877	11/7/95	BPS
K	CHG PER ECO	26800	10/10/95	BPS
J	CHG SHT 2 & 5	26689	9/18/95	BPS
I	MOVE PAN SCREWS	26631	8/22/95	BPS
H	CHG PER ECO	26598	8/10/95	BPS
G	CHG PER ECO	26555	7/25/95	BPS
F	CHG PER ECO	26407	6/13/95	BPS
E1	CHG SHT 6 PER ECO	26368	5/31/95	
E	CHG PER ECO	26050	4/25/95	BPS
D	MOVE BELT CLAMP;ADD GRND SPRING & WASHR	25918	1/26/95	BPS
C	TOTAL REDRAW PER ECO	25821	1/3/95	BPS
B	TOTAL REDRAW PER ECO	25746	11/18/94	BPS
A	RELEASE TO PRODUCTION	25527	10/5/94	BPS

SHEET	REV
6	Y
5	N
4	Z
3	N
2	AB
1	AB

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES
PRODUCTION TOLERANCES
.X± .015 ANGULAR TOL. ±2°
.XX± .010
.XXX± .005
SURFACE FINISH 63

SIGNATURE	DATE
DRN BY: B.SMITH	8/19/94
ENGR: B.BEDARD	11/11/94

MATERIAL: FINISH:

DO NOT SCALE | REMOVE ALL BURRS | BREAK SHARP EDGES

THIRD ANGLE PROJECTION

THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION OF BIO-TEK INSTRUMENTS, INC. AND NEITHER IT NOR THE INFORMATION CONTAINED THEREIN SHALL BE DISCLOSED TO OTHERS OR DUPLICATED OR USED FOR OTHERS WITHOUT THE PRIOR CONSENT OF BIO-TEK INSTRUMENTS, INC.

BIO-TEK INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404-0998

TITLE: FINAL ASBY

SIZE D | DRAWING NO. 7330005-AS | REV AB

SCALE: 3/4 | SHEET 1 OF 6

NOTES:

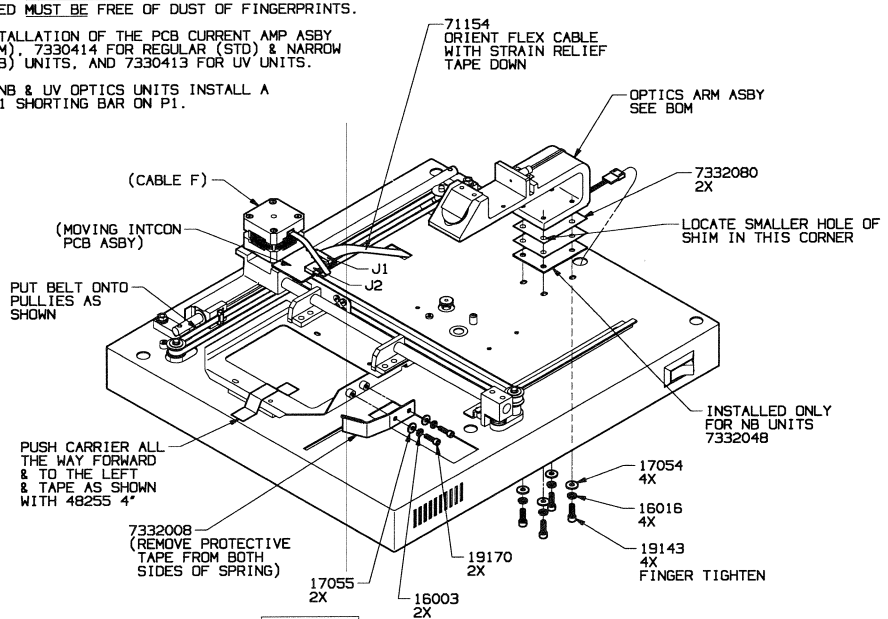
4 CLEAN MOUNTING SURFACE WITH ALCOHOL BEFORE APPLYING. POSITION APPROX. WHERE SHOWN, UNLESS OTHERWISE SPECIFIED.

5 HANDLE BY EDGE ONLY. CLEAN WITH LENS PAPER, IF NEEDED MUST BE FREE OF DUST OF FINGERPRINTS.

5.5 FOR INSTALLATION OF THE PCB CURRENT AMP ASBY (REF BOM), 7330414 FOR REGULAR (STD) & NARROW BEAM (NB) UNITS, AND 7330413 FOR UV UNITS.

NOTE: FOR NB & UV OPTICS UNITS INSTALL A 42151 SHORTING BAR ON P1.

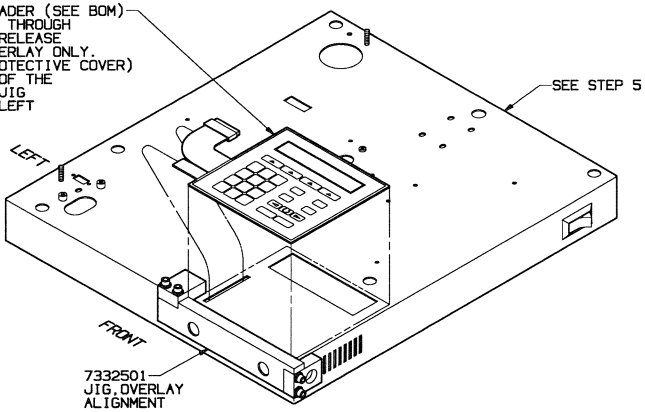
WIRE LIST		
CABLE DESIGNATOR	TO	CONN.
71154	MOVING INTCON PCB ASBY	J1
CABLE F	MOVING INTCON PCB ASBY	J2
CABLE B	MAIN PCB ASBY	J1
CABLE D	MAIN PCB ASBY	J2
CABLE E	MAIN PCB ASBY	J3
71154	MAIN PCB ASBY	J6
805 CABLE BJ	MAIN PCB ASBY	J7
CABLE A	MAIN PCB ASBY	J8
OVRLY KEYBOARD	MAIN PCB ASBY	J9
75049	MAIN PCB ASBY	J5
75037	MAIN PCB ASBY	J4
CABLE I	MAIN PCB ASBY	J11


71154
ORIENT FLEX CABLE WITH STRAIN RELIEF TAPE DOWN
OPTICS ARM ASBY SEE BOM
(CABLE F)
(MOVING INTCON PCB ASBY)
7332080 2X
LOCATE SMALLER HOLE OF SHIM IN THIS CORNER
J1
J2
PUT BELT ONTO PULLIES AS SHOWN
INSTALLED ONLY FOR NB UNITS 7332048
PUSH CARRIER ALL THE WAY FORWARD & TO THE LEFT & TAPE AS SHOWN WITH 48255 4"
17054 4X
16016 4X
19143 4X FINGER TIGHTEN
7332008 (REMOVE PROTECTIVE TAPE FROM BOTH SIDES OF SPRING)
19170 2X
17055 2X
16003 2X

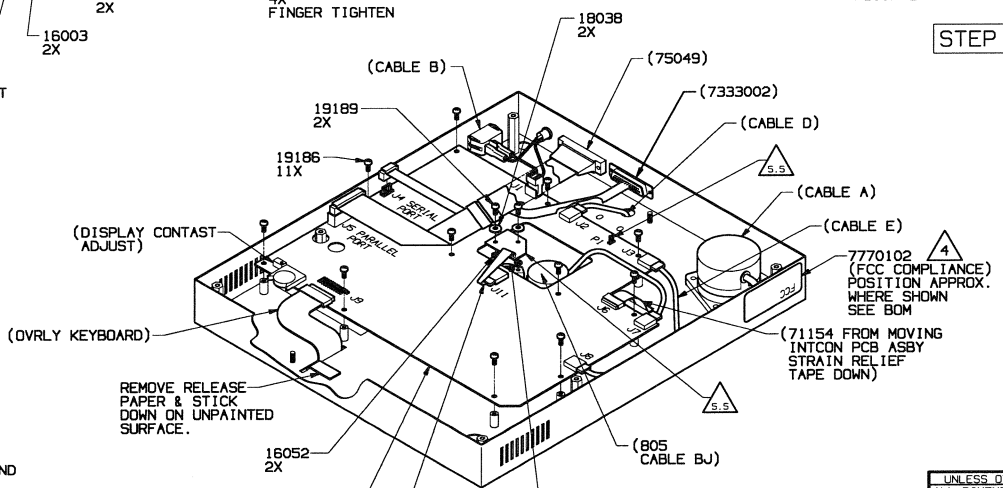
STEP 5

SEE WIRING LIST

4 OVRLY KEYBOARD X-Y READER (SEE BOM) INSERT OVERLAY CABLES THROUGH SLOT IN CASE. REMOVE RELEASE PAPER FROM BACK OF OVERLAY ONLY. (INCLUDING DISPLAY PROTECTIVE COVER) ALIGN THE FRONT EDGE OF THE OVERLAY WITH EDGE OF JIG PUSH OVERLAY AGAINST LEFT SIDE OF JIG & STICK OVERLAY DOWN.

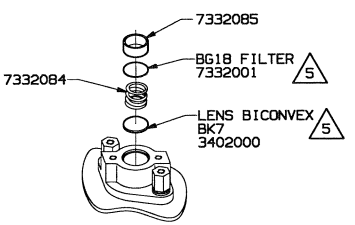


STEP 6



STEP 7

SEE WIRING LIST



DETAIL 3

MAIN PCB ADJUSTMENT

STEP 7A: PLUG IN POWER SUPPLY (61062, SEE STEP 8) AND SWITCH POWER ON. THE LAMP SHOULD LIGHT.

STEP 7B: ADJUST DISPLAY CONTRAST WITH DISPLAY CONTRAST ADJUSTMENT POT (SEE LOCATION STEP 7). ALIGN MAIN PCB ASBY SO THAT THE DISPLAY IS CENTERED WITH OVERLAY WINDOW. TIGHTEN MOUNTING SCREWS (11X).

UNLESS OTHERWISE SPECIFIED	SIGNATURE	DATE
ALL DIMENSIONS ARE IN INCHES	DRN BY: B.SMITH	8/26/94
PRODUCTION TOLERANCES .X±.015 ANGULAR TOL.±2° .XX±.010 .XXX±.005 SURFACE FINISH 63	ENGR: B.BEDARD	11/11/94

THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION OF BIO-TEK INSTRUMENTS INC. AND IN ANY FILTER IT NOR THE INFORMATION CONTAINED THEREIN SHALL BE DISCLOSED OR USED FOR OTHERS THAN IN SUCH CAPACITY AS GRANTED HEREUNDER WITHOUT EXPRESS WRITTEN CONSENT OF BIO-TEK INSTRUMENTS INC.

THIRD ANGLE PROJECTION

MATERIAL: | FINISH:

DO NOT SCALE | REMOVE ALL BURRS | BREAK SHARP EDGES

BIO-TEK INSTRUMENTS, INC. HIGHLAND PARK, BOX 998 WINOOSKI, VT. 05404-0998

TITLE: FINAL ASBY

SIZE D | DRAWING NO. 7330005-AS | REV AB

SCALE: 1/2 | SHEET 2 OF 6

OPTICS ALIGNMENT

STEP 8A: REMOVE THE CARRIER TAPE.

STEP 8B: WITH THE POWER SUPPLY (61062) ON AND THE LAMP LIT, SLIDE THE CARRIER UNDER THE OPTICS ARM SO THE LIGHT BEAM STRIKES IT.

STEP 8C: LOOSEN THE LAMP MOUNTING SCREWS (2X). ADJUST THE LAMP FORWARD UNTIL IT HITS THE OPTIC ARM. FOR UV AND NB UNITS SEE DETAIL 5. ROTATE AND/OR SWING THE LAMP LEFT/RIGHT TO GET A CIRCULAR IMAGE ON THE CARRIER. TIGHTEN THE LAMP MOUNTING SCREWS (2X). VERIFY THE IMAGE IS STILL CIRCULAR.

STEP 8D: INSERT JIG LIGHT BEAM CENTER AS SHOWN IN STEP 8. ADJUST THE OPTICS ARM SO THAT THE BEAM IS IN THE CENTER OF THE JIG. TORQUE THE OPTICS ARM MOUNTING SCREWS TO 22in/lbs (4X). VERIFY NOTHING HAS CHANGED.

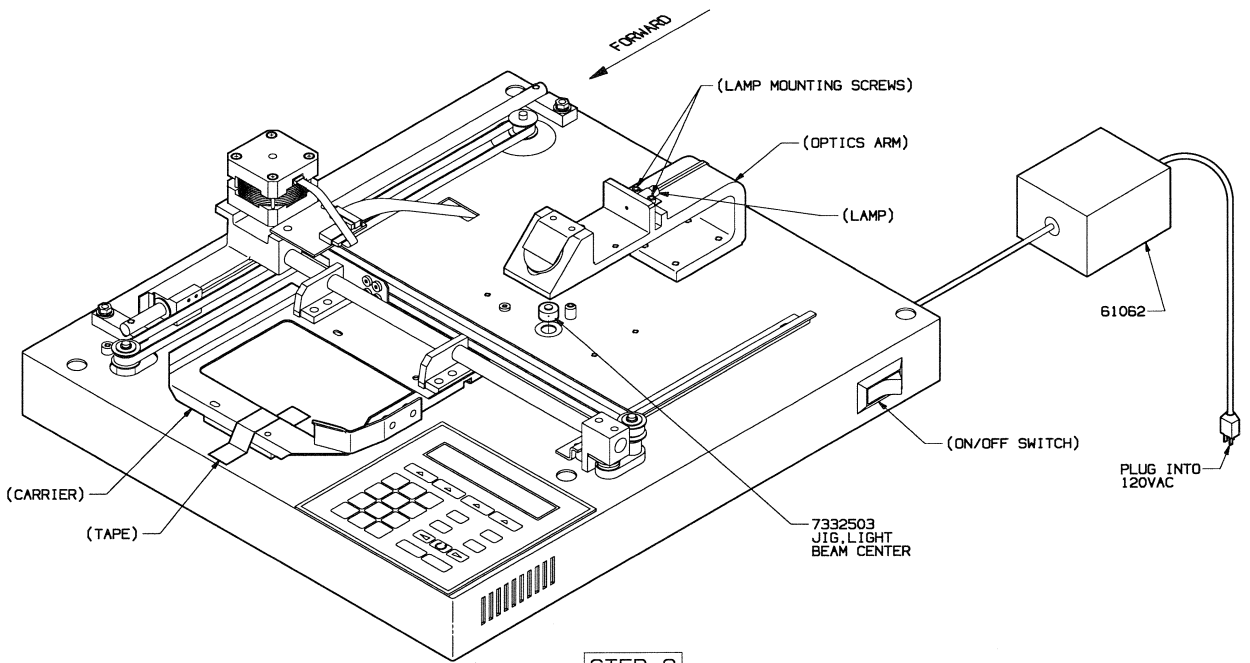
STEP 8E: INSERT 6 FILTER CAL PLATE ASBY JIG, 7332513, INTO THE CARRIER AS SHOWN IN DETAIL 4. SLIDE THE GO/NO GO OPTIC ARM JIG (7332514 FOR NB, 7332515 FOR STD AND UV) BETWEEN THE OPTIC ARM AND THE CAL PLATE JIG AS SHOWN IN DETAIL 4.

STEP 8F: IF THE "GO" PORTION OF THE JIG PASSES UNDER THE OPTIC ARM, AND THE "NO GO" PORTION DOES NOT, THEN THE OPTIC ARM HEIGHT IS CORRECT. NO FURTHER ADJUSTMENT IS NECESSARY. GO TO STEP 8I. IF THE "GO" PORTION OF THE JIG DOES NOT PASS UNDER THE OPTIC ARM, GO TO STEP 8G. IF THE "NO GO" PORTION OF THE JIG PASSES UNDER THE OPTIC ARM, GO TO STEP 8H.

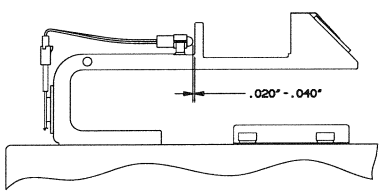
STEP 8G: IF THE "GO" PORTION OF THE JIG DOES NOT PASS UNDER THE OPTIC ARM, THEN THE OPTIC ARM IS TOO LOW. REMOVE THE OPTIC ARM MOUNTING SCREWS. ADD ONE SHIM, 7332080, UNDER THE OPTIC ARM AND REASSEMBLE. REPEAT STEPS 8A THRU 8F. THIS STEP MAY BE REPEATED ONCE MORE. IF THE "GO" PORTION OF THE JIG STILL DOES NOT PASS UNDER THE OPTIC ARM AFTER ADDING TWO SHIMS, THEN THE UNIT HAS FAILED.

STEP 8H: IF THE "NO GO" PORTION OF THE JIG PASSES UNDER THE OPTIC ARM, THEN THE OPTIC ARM IS TOO HIGH. REMOVE THE OPTIC ARM MOUNTING SCREWS. REMOVE ONE SHIM, 7332080, FROM UNDER THE OPTIC ARM AND REASSEMBLE. REPEAT STEPS 8A THRU 8F. THIS STEP MAY BE REPEATED ONCE MORE. IF AFTER REMOVING BOTH SHIMS, THE "NO GO" PORTION OF THE JIG STILL PASSES UNDER THE OPTIC ARM, THEN THE UNIT HAS FAILED.

STEP 8I: TURN OFF UNIT, DISCONNECT POWER SUPPLY. REMOVE JIGS FROM CARRIER. RETAPE CARRIER AS SHOWN IN STEP 8. COMPLETE ASSEMBLY/ALIGNMENT SECTION ON DATA SHEET.

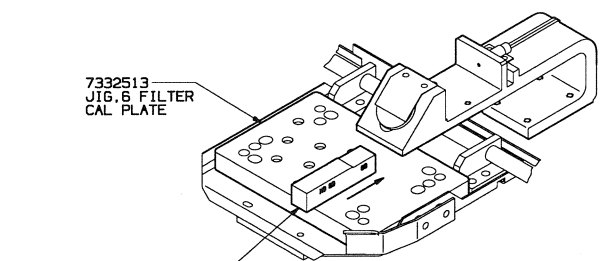


STEP 8



DETAIL 5

FOR UV AND NB UNITS ONLY
SPACE BULB BACK AS SHOWN.



DETAIL 4

UNLESS OTHERWISE SPECIFIED	SIGNATURE	DATE
ALL DIMENSIONS ARE IN INCHES	DRN BY: B.SMITH	8/26/94
PRODUCTION TOLERANCES .X±.015 ANGULAR TOL.±2° .XX±.010 .XXX±.005 SURFACE FINISH 63	ENGR: B.BEDARD	11/11/94
MATERIAL:	FINISH:	
DO NOT SCALE	REMOVE ALL BURRS / BREAK SHARP EDGES	THIRD ANGLE PROJECTION

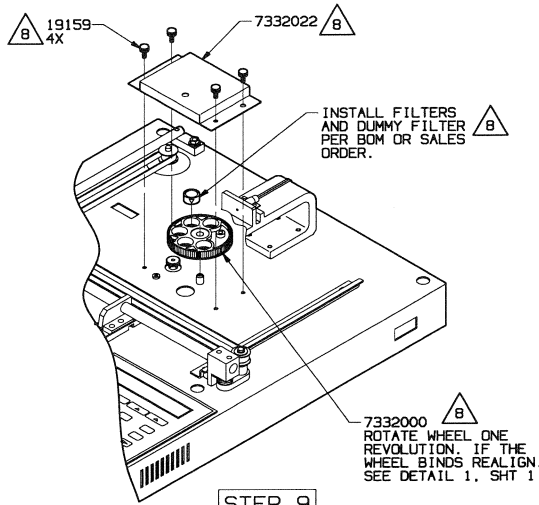
THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION OF BIO-TEK INSTRUMENTS, INC. AND NEITHER IT NOR THE INFORMATION CONTAINED THEREIN IS TO BE DISCLOSED TO OTHERS OR DUPLICATED OR USED FOR OTHERS WITHOUT EXPRESS WRITTEN CONSENT OF BIO-TEK INSTRUMENTS, INC.

BIO-TEK INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404-0998

TITLE: FINAL ASBY

SIZE	DRAWING NO.	REV
D	7330005-AS	N

SCALE: 3/4 SHEET 3 OF 6


8 19159 4X
7332022 8
INSTALL FILTERS AND DUMMY FILTER PER BOM OR SALES ORDER. 8
7332000 8
ROTATE WHEEL ONE REVOLUTION. IF THE WHEEL BINDS REALIGN. SEE DETAIL 1, SHT 1

STEP 9

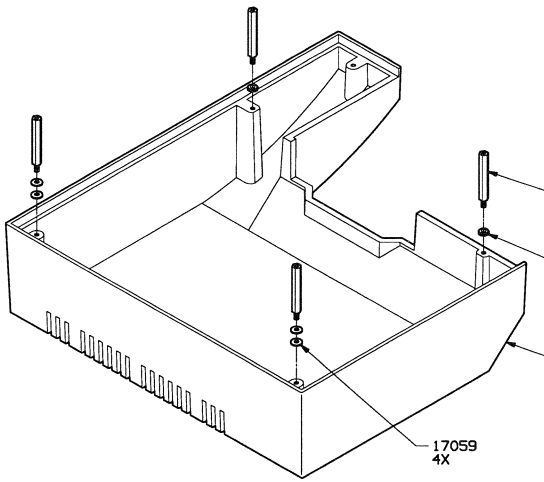
NOTES:

6 POSITION (7332011 WITHOUT MOUNTING HARDWARE) AND TOP COVER IN PLACE AND TEST PER TEST PROCEDURE. FOLLOWING TEST, COMPLETE STEP 10.

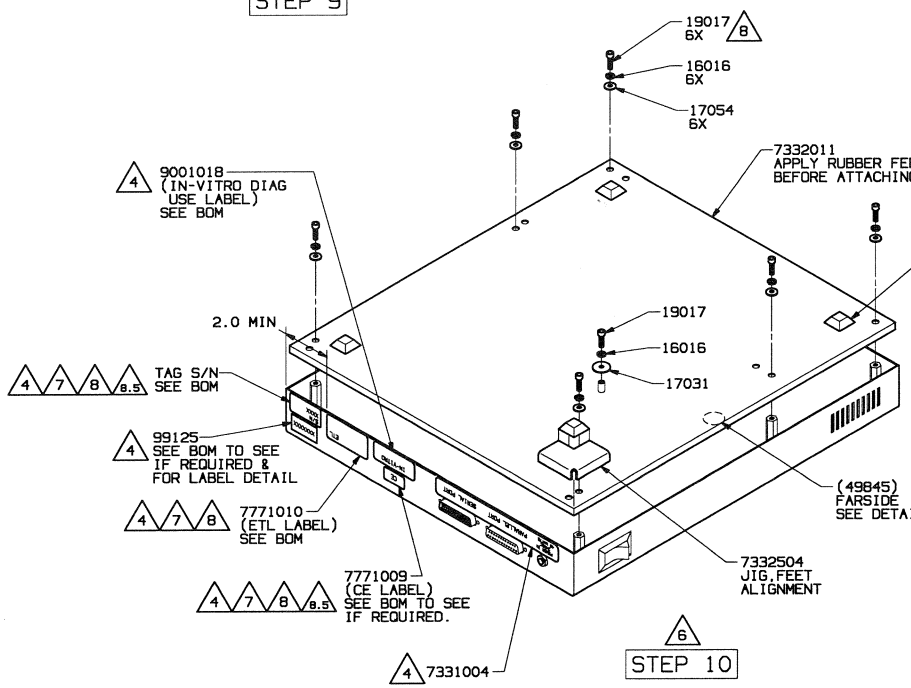
7 TO BE INSTALLED BY CERTIFIED TECHNICIAN ONLY AFTER ALL TESTS HAVE PASSED USING TEST PROCEDURE.

8 PERFORMED AT FINAL WORK STATION.

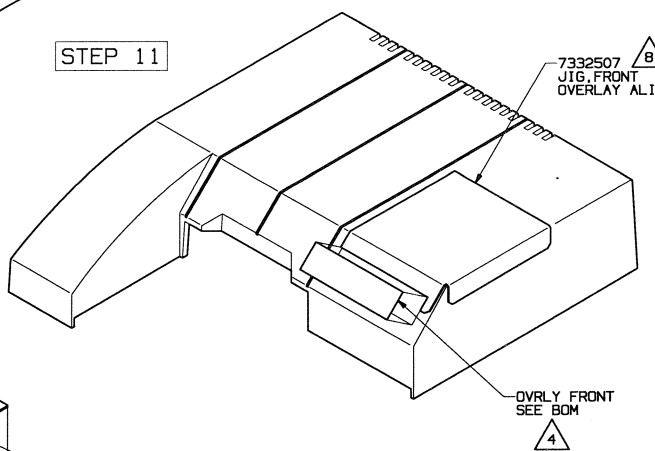
8.5 SOME SERIAL NUMBER TAGS HAVE THE CE MARK, APPLY LABELS PER BOM.

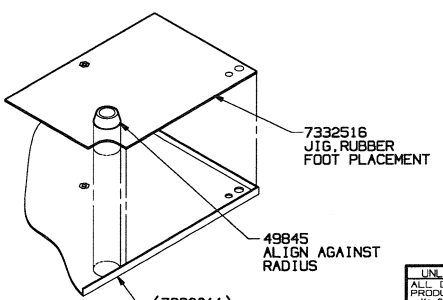


STEP 11


19017 6X 8
16016 6X
17054 6X
7332011 APPLY RUBBER FEET BEFORE ATTACHING.
4 9001018 (IN-VITRO DIAG USE LABEL) SEE BOM
49166 4X 4 USE JIG 7332504 TO POSITION RUBBER FEET BEFORE MOUNTING COVER.
2.0 MIN
19017
16016
17031
4 7 8 8.5 TAG S/N SEE BOM
4 99125 SEE BOM TO SEE IF REQUIRED & FOR LABEL DETAIL
4 7 8 7771010 (ETL LABEL) SEE BOM
4 7 8 8.5 7771009 (CE LABEL) SEE BOM TO SEE IF REQUIRED.
4 7331004
(49845) FARSIDE SEE DETAIL 6
7332504 JIG, FEET ALIGNMENT

6 STEP 10

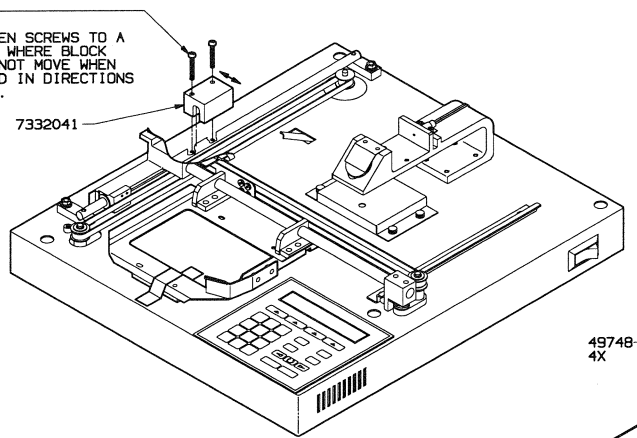




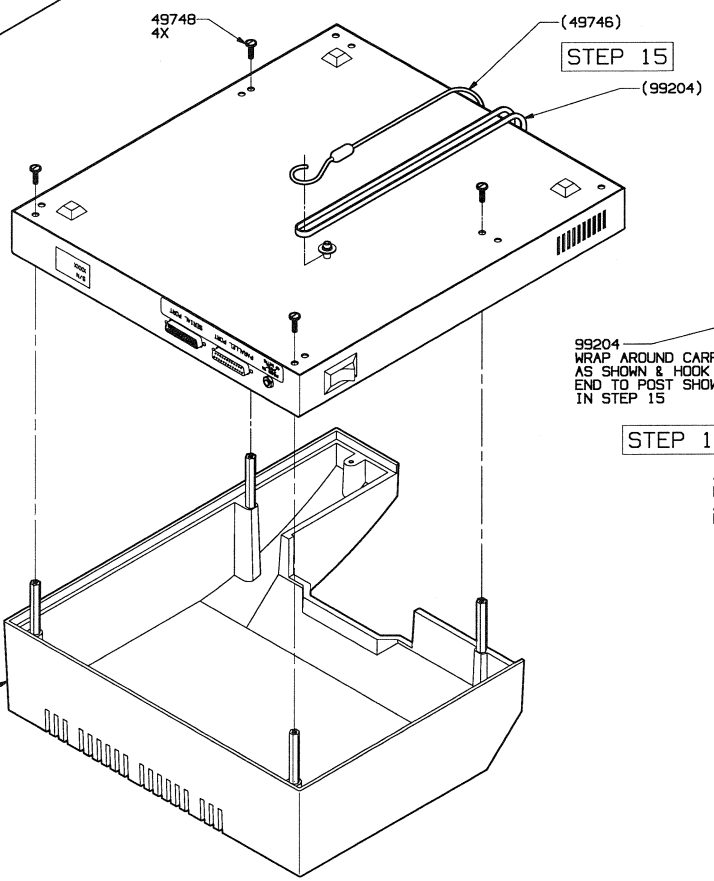
DETAIL 6

UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS ARE IN INCHES. PRODUCTION TOLERANCES: .X± .015, .XX± .010, .XXX± .005; ANGULAR TOL. ±2°; SURFACE FINISH 63	SIGNATURE	DATE	BIO-TEK INSTRUMENTS, INC. HIGHLAND PARK, BOX 998 WINOOSKI, VT. 05404-0998
	DRN BY: B.SMITH	8/26/94	
	ENGR: B.BEDARD	11/11/94	
THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION OF BIO-TEK INSTRUMENTS INC. AND NEITHER IT NOR THE INFORMATION CONTAINED THEREIN SHALL BE DISCLOSED TO OTHERS OR DUPLICATED OR USED FOR OTHERS WITHOUT EXPRESS WRITTEN CONSENT OF BIO-TEK INSTRUMENTS INC.			TITLE: FINAL ASBY
MATERIAL:	FINISH:		SIZE D; DRAWING NO. 7330005-AS; REV Z
DO NOT SCALE	REMOVE ALL BURRS; BREAK SHARP EDGES	THIRD ANGLE PROJECTION	SCALE: 1/2; SHEET 4 OF 6

NOTE: ALL STEPS ON THIS PAGE PERFORMED AT FINAL WORK STATION.



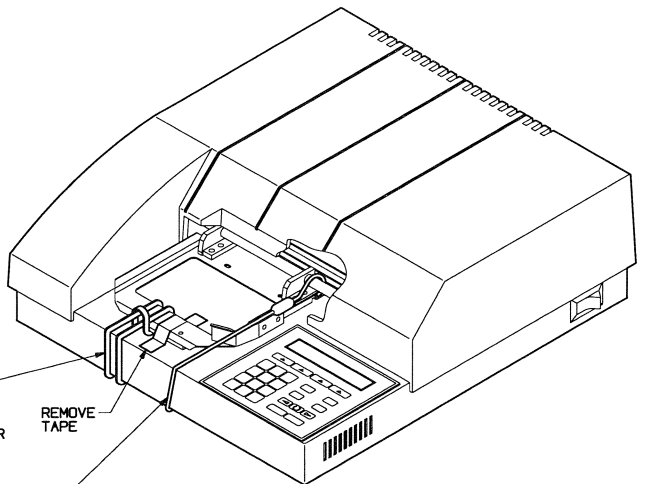
STEP 12



STEP 15

STEP 13

SEE STEP 11


99204
WRAP AROUND CARRIER AS SHOWN & HOOK OTHER END TO POST SHOWN IN STEP 15
REMOVE TAPE
49746
HOOK AROUND SHAFT AS SHOWN & HOOK OTHER END TO POST SHOWN IN STEP 15

STEP 14

UNLESS OTHERWISE SPECIFIED		SIGNATURE	DATE
ALL DIMENSIONS ARE IN INCHES	DRN BY:	B.SMITH	8/26/94
PRODUCTION TOLERANCES	ENGR:	B.BEDARD	11/11/94
.X±.015 ANGULAR TOL. ±2°			
.XX±.010 SURFACE FINISH 63			
.XXX±.005			
MATERIAL:	FINISH:		
DO NOT SCALE	REMOVE ALL BURRS	BREAK SHARP EDGES	

THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION OF BIO-TEK INSTRUMENTS INC. AND NEITHER IT NOR THE INFORMATION CONTAINED THEREIN SHALL BE DISCLOSED TO OTHERS OR DUPLICATED OR USED FOR OTHERS WITHOUT EXPRESS WRITTEN CONSENT OF BIO-TEK INSTRUMENTS INC.

THIRD ANGLE PROJECTION

BIO-TEK INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404-0998

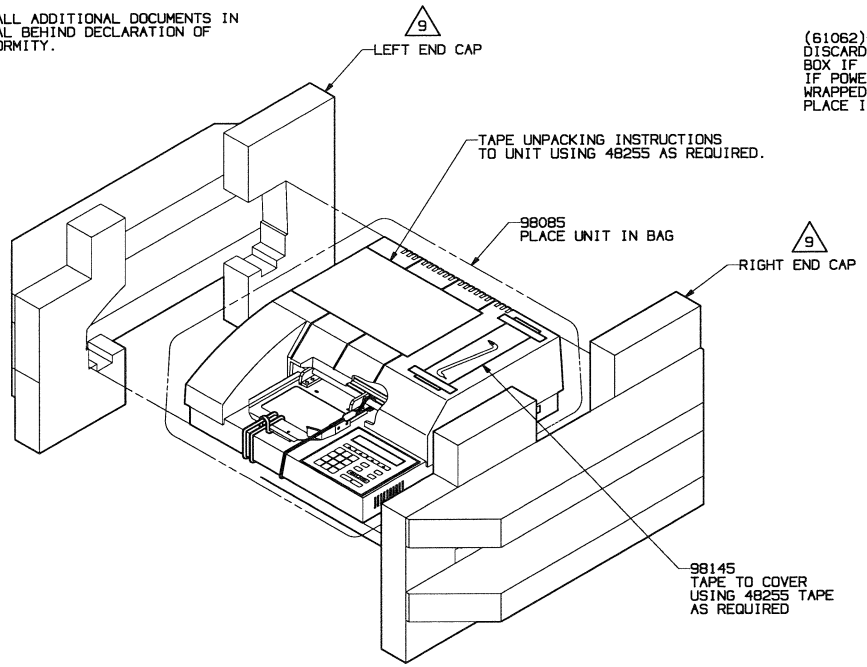
TITLE: FINAL ASBY

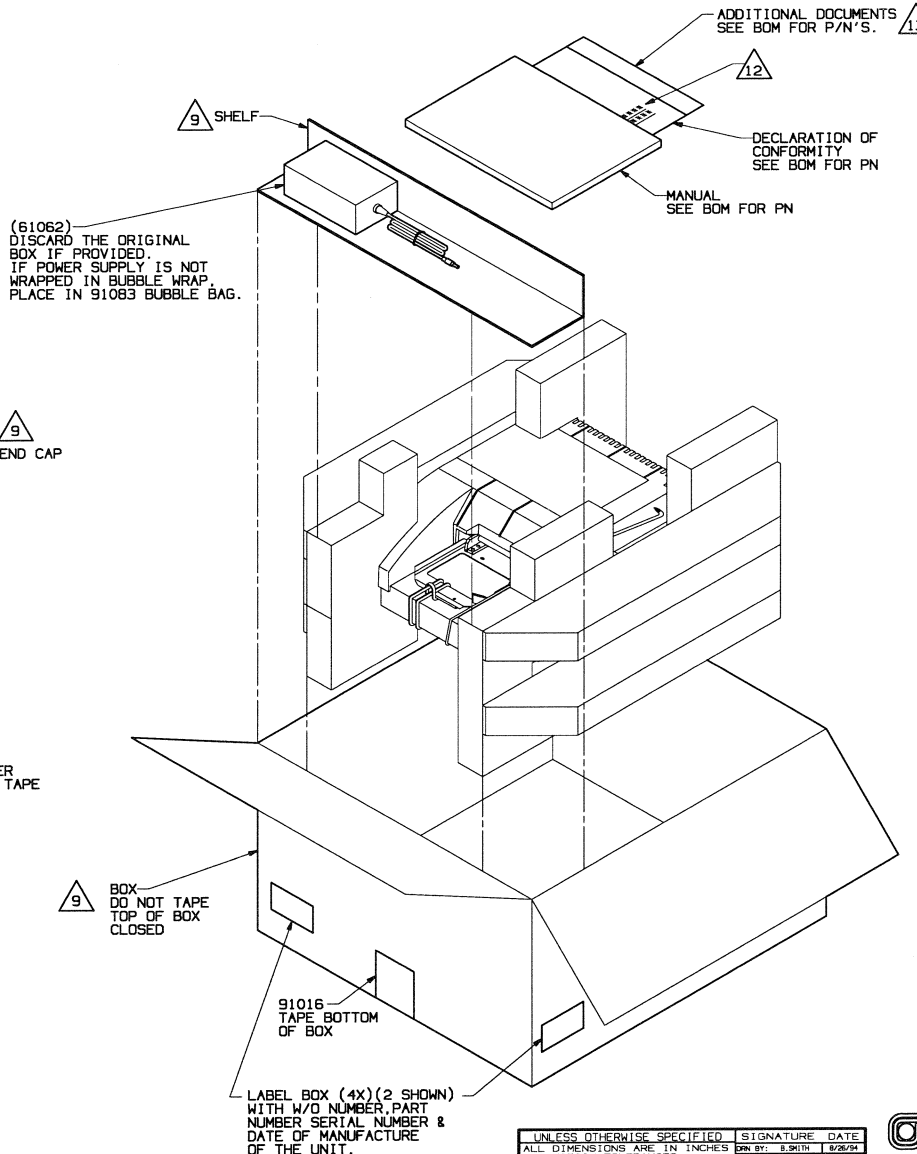
SIZE	DRAWING NO.	REV
D	7330005-AS	N

SCALE: 1/2 SHEET 5 OF 6

NOTES:

9. PART OF SHIPPING BOX, END CAPS, SHELF.
10. ALL DETAIL THIS PAGE PERFORMED AT FINAL WORK STATION.
11. OTHER OPTIONAL ACCESSORIES MAY BE REQUIRED- SEE BOM.
12. CLEARLY MARK THE SERIAL NUMBER AND YEAR OF MANUFACTURE ON THE COPY. INSERT IN MANUAL BEFORE 1st PAGE.
13. INSTALL ADDITIONAL DOCUMENTS IN MANUAL BEHIND DECLARATION OF CONFORMITY.




ADDITIONAL DOCUMENTS SEE BOM FOR P/N'S.
13
12
9
SHELF
DECLARATION OF CONFORMITY SEE BOM FOR PN
MANUAL SEE BOM FOR PN
(61062)
DISCARD THE ORIGINAL BOX IF PROVIDED.
IF POWER SUPPLY IS NOT WRAPPED IN BUBBLE WRAP, PLACE IN 91083 BUBBLE BAG.
9
BOX
DO NOT TAPE TOP OF BOX CLOSED
91016
TAPE BOTTOM OF BOX
LABEL BOX (4X)(2 SHOWN) WITH W/O NUMBER, PART NUMBER SERIAL NUMBER & DATE OF MANUFACTURE OF THE UNIT.

UNLESS OTHERWISE SPECIFIED	SIGNATURE	DATE
ALL DIMENSIONS ARE IN INCHES	DRN BY: B.SMITH	8/26/94
PRODUCTION TOLERANCES	ENGR: B.BEDARD	11/11/94
.X±.015 ANGULAR TOL. ±2°		
.XX±.010		
.XXX±.005 SURFACE FINISH 63		
MATERIAL:	FINISH:	
DO NOT SCALE	REMOVE ALL BURRS	BREAK SHARP EDGES

THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION OF BIO-TEK INSTRUMENTS INC. AND NEITHER IT NOR THE INFORMATION CONTAINED THEREIN SHALL BE DISCLOSED TO OTHERS OR DUPLICATED OR USED FOR OTHERS WITHOUT EXPRESS WRITTEN CONSENT OF BIO-TEK INSTRUMENTS INC.

THIRD ANGLE PROJECTION

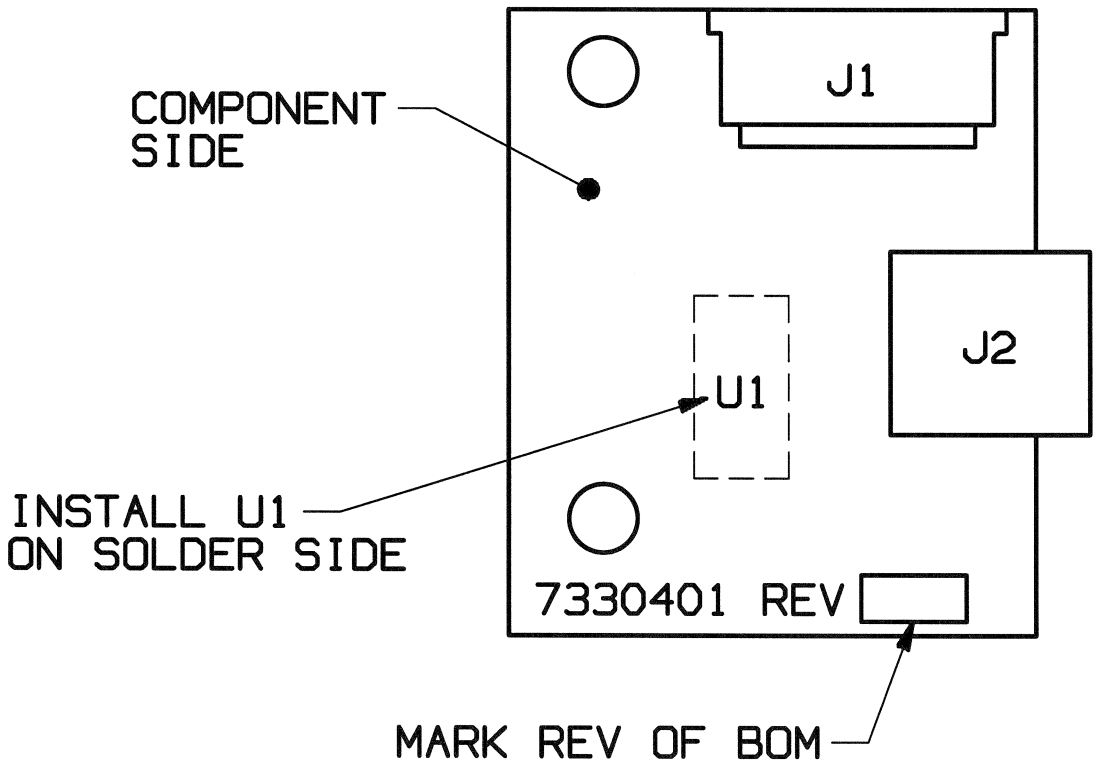
BIO-TEK INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404-0998

TITLE: FINAL ASBY

SIZE	DRAWING NO.	REV
D	7330005-AS	Y

SCALE: 1/2 SHEET 6 OF 6

REV	DESCRIPTION	ECO	DATE	BY
A	RELEASE TO PRODUCTION	25462	9/13/94	BPS



BIO-TEK® INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404-0998

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES
PRODUCTION TOLERANCES
.X±.015 ANGULAR TOL. ±2°
.XX±.010 SURFACE FINISH 63
.XXX±.005

MATERIAL:

FINISH:

DO NOT SCALE | BREAK SHARP EDGES

SIGNATURES	DATE
DRN BY: B.SMITH	9/8/94
ENGR	

THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION OF BIO-TEK INSTRUMENTS INC. AND NEITHER IT NOR THE INFORMATION CONTAINED THEREIN SHALL BE DISCLOSED TO OTHERS OR DUPLICATED OR USED FOR OTHERS WITHOUT EXPRESS WRITTEN CONSENT OF BIO-TEK INSTRUMENTS INC.

TITLE

MOVING INTCON PCB ASBY

SIZE	DRAWING NO.	REV
A	7330401-AS	A

SCALE: 2/1 | SHEET 1 OF 1

ASSEMBLY INSTRUCTIONS FOR BTI P/N'S 7330413 & 7330414

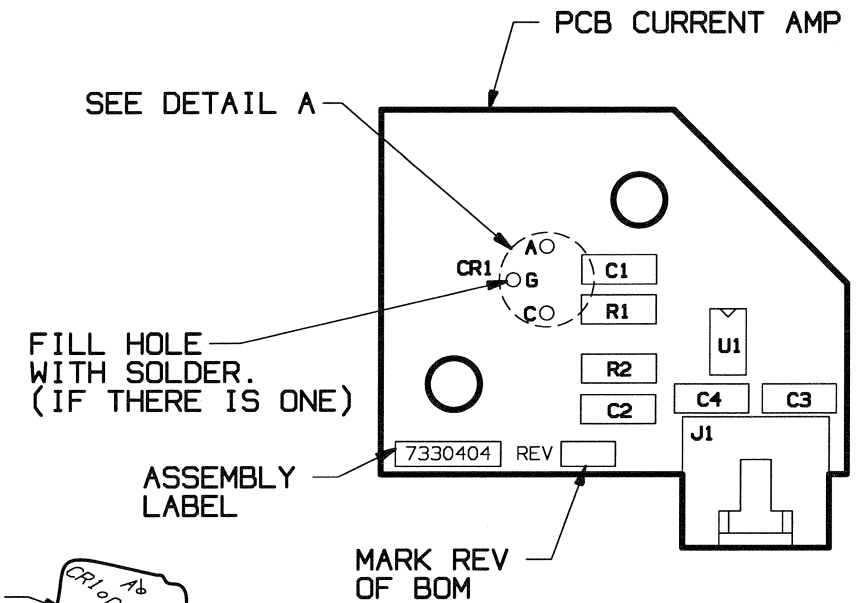
1. INSTALL ALL COMPONENTS EXCEPT THE PHOTODIODE.
2. FILL THE G HOLE (CR1) WITH SOLDER IF THERE IS ONE.
3. CLEAN WITH ISOPROPAL ALCOHOL OR ULTRAPONIC CLEANER TO ACHIVE A CLEANLINESS LEVEL OF 1 Ng OF NoCl/cm^2
4. BAKE FOR 2HR 180°F.
5. INSTALL DIODE PER PRINT. USE NO CLEAN SOLDER.
6. LABEL ASSEMBLY WITH BOM #.
7. SPACE DIODE .010 TO .015 ABOVE PCB SUEFACE.

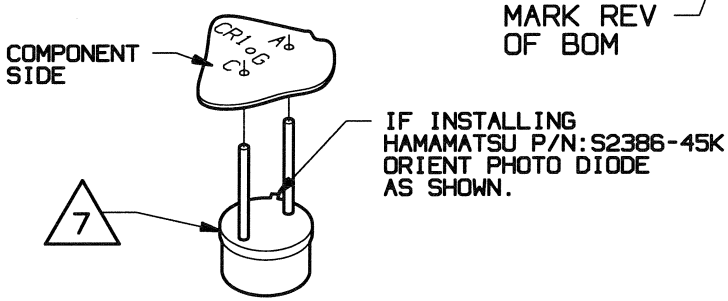
ADDITIONAL INSTRUCTIONS FOR BTI P/N 7330414

THIS ASSEMBLY SHALL BE COATED BY ONE OF THE FOLLOWING ALTERNATE METHODS

PROCESS A: 1. PROCESS PER BIO-TEK MANUFACTURING PROCESS P481.

PROCESS B:
1. MASK THE DIODE GLASS AND CONNECTOR.
2. COAT USING HYSOL #PC18M IN ACCORDANCE WITH MIL-I-46058C TYPE UR.
3. REMOVE THE MASKING MATERIAL AND CLEAN THE DIODE GLASS WITH ISOPROPYL ALCOHOL.
4. INSPECT THE ASSEMBLY TO CONFIRM THAT THE BOARD IS FULLY COATED EXCEPT FOR THE DIODE GLASS AND INSIDE OF THE CONNECTOR.





DETAIL A

REV	DESCRIPTION	ECO	DATE	BY
I	REPLACE COATING PROCESS	28312	11/15/96	BPS
H	CHG COATING TO HUMI SEAL 1B73	27790	8/6/96	PEB
G	7330414 GETS COATING, 7330413 DOESN'T	27767	8/2/96	BPS
F	CHG CONFORMAL COATING	27745	7/30/96	PEB
E	CHG ASSEMBLY INSTRUCTIONS	27662	7/2/96	PEB
D	REDRAW	27284	3/6/96	BPS
C	ADD LENGTH : ADD DETAIL B	27179	2/2/96	BPS
B	CHG:WIRE LENGTH:ADD:NOTE	26883	11/14/95	BPS
A	RELEASE TO PRODUCTION	26698	9/12/95	BPS

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES
PRODUCTION TOLERANCES
.X±.015 ANGULAR TOL.±2°
.XX±.010
.XXX±.005
SURFACE FINISH 63

MATERIAL:

FINISH:

DO NOT SCALE | REMOVE ALL BURRS | BREAK SHARP EDGES

SIGNATURE	DATE
DRN BY: B.SMITH	8/22/95
ENGR: B.BEDARD	9/13/95

THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION OF BIO-TEK INSTRUMENTS INC. AND NEITHER IT NOR THE INFORMATION CONTAINED THEREIN SHALL BE DISCLOSED TO OTHERS OR DUPLICATED OR USED FOR OTHERS WITHOUT EXPRESS WRITTEN CONSENT OF BIO-TEK INSTRUMENTS INC.

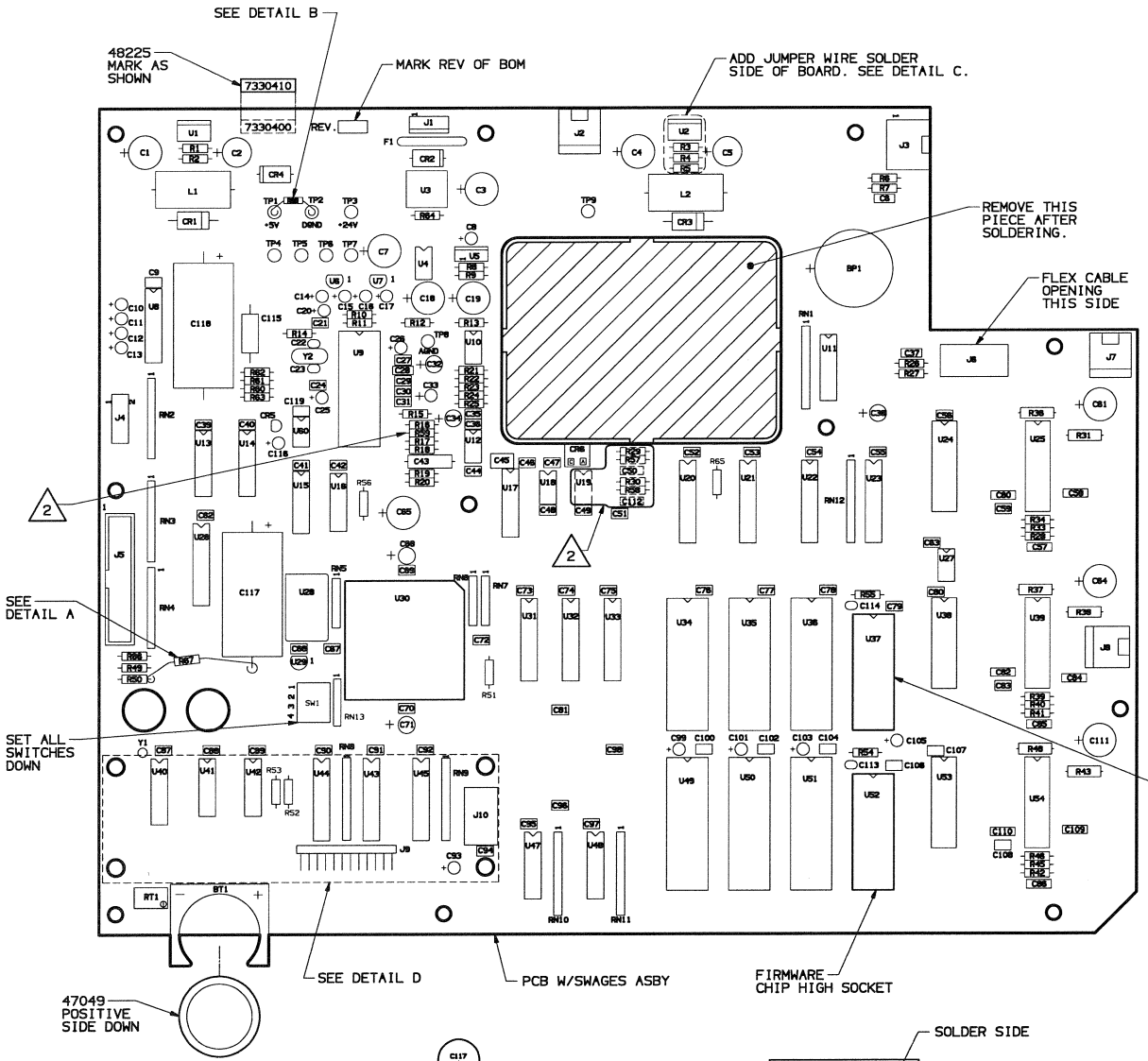
THIRD ANGLE PROJECTION

BIO-TEK INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404-0998

TITHE: PCB CURRENT AMP ASBY

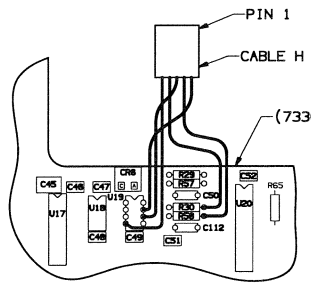
SIZE	DRAWING NO.	REV
B	7330404-AS	I

SCALE: 2/1 SHEET 1 OF 1



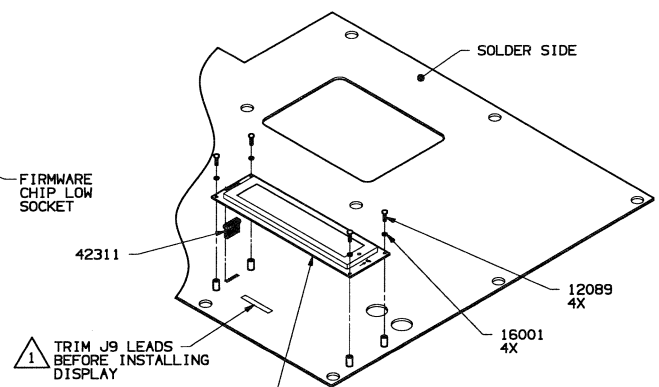
NOTES:

1. SOLDER 42311 TO DISPLAY BEFORE MOUNTING DISPLAY TO BOARD (LOCATE IN HOLES 1-14). HOLES 15 & 16 NOT USED.
2. COMPONENTS NOT INSTALLED. SEE DETAIL E FOR INSTALLATION OF CABLE H.

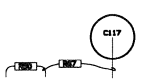


DETAIL E

CONN PIN	PCB LOCATION
1	U19, PIN 7
2	R58
3	U19, PIN 6
4	R30
5	U19, PIN 4

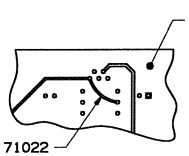


DETAIL D



DETAIL A DETAIL B

FORM LEADS TO ENSURE PROPER STRESS RELIEF. THEN WRAP AND SOLDER AS SHOWN



DETAIL C

REV	DESCRIPTION	ECO	DATE	BY
E	CHG PER ECO	27841	8/20/96	PEB
D	CHG PER ECO	27284	3/6/96	BPS
C	CHG PER ECO	27183	2/5/96	BPS
B	CHG NOTE 2: ADD NOTES	27129	1/25/96	BPS
A	RELEASE TO PRODUCTION	26890	11/14/95	BPS

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES
PRODUCTION TOLERANCES
.X± .015 ANGULAR TOL. ±2°
.XX± .010
.XXX± .005
SURFACE FINISH 63

SIGNATURE	DATE
DRN BY: B.SMITH	11/6/95
ENGR: B.BEDARD	11/16/95

MATERIAL: FINISH:

DO NOT SCALE | REMOVE ALL BURRS | BREAK SHARP EDGES

THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION OF BIO-TEK INSTRUMENTS INC. AND NEITHER IT NOR THE INFORMATION CONTAINED THEREIN SHALL BE DISCLOSED TO OTHERS OR DUPLICATED OR USED FOR OTHERS WITHOUT EXPRESS WRITTEN CONSENT OF BIO-TEK INSTRUMENTS INC.

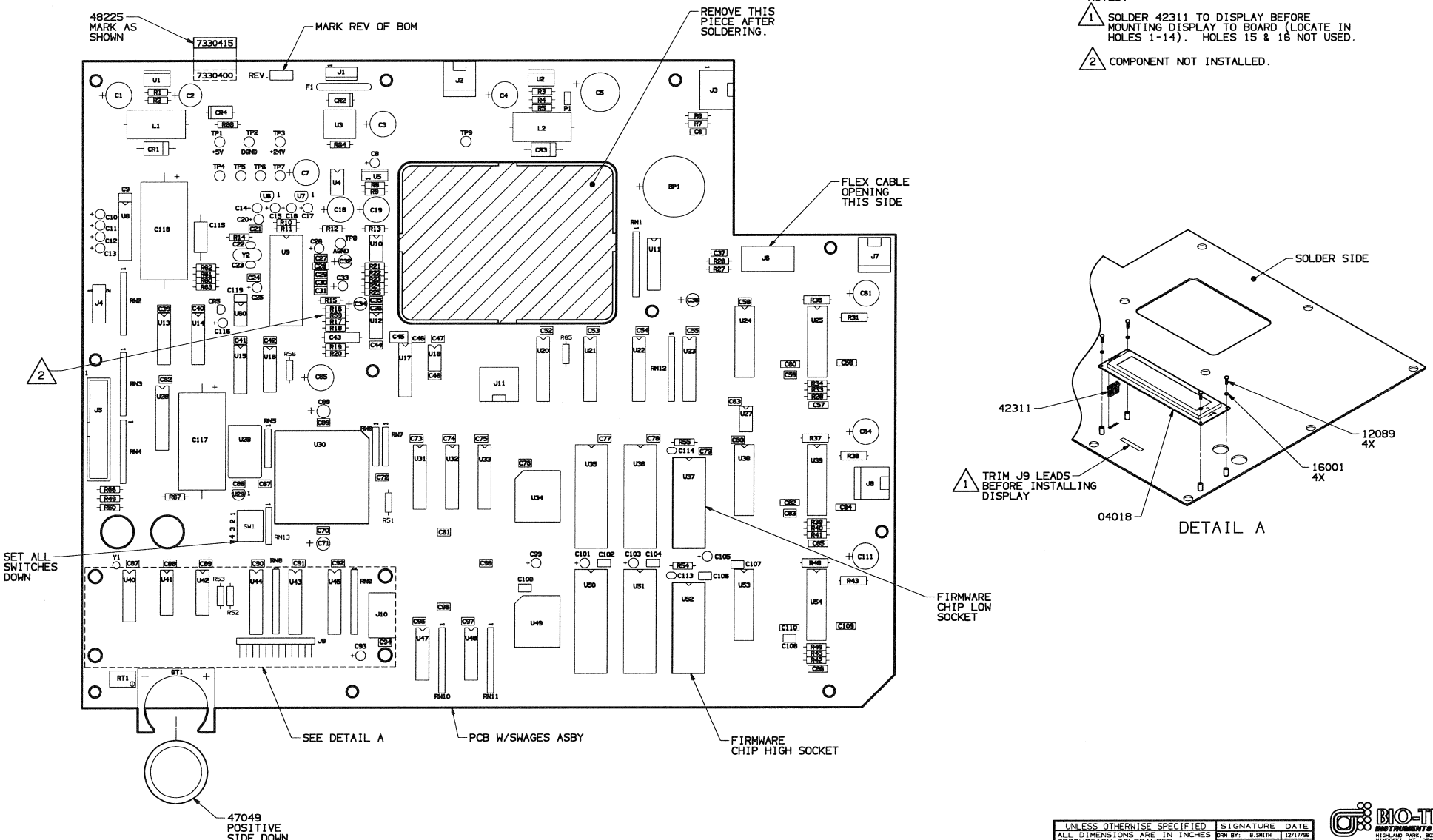
THIRD ANGLE PROJECTION

BIO-TEK INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404-0998

TITLE:
MAIN PCB ASBY (LESS FRONT END)

SIZE D | DRAWING NO. 7330410-AS | REV E

SCALE: NONE | SHEET 1 OF 1



NOTES:

1. SOLDER 42311 TO DISPLAY BEFORE MOUNTING DISPLAY TO BOARD (LOCATE IN HOLES 1-14). HOLES 15 & 16 NOT USED.
2. COMPONENT NOT INSTALLED.

DETAIL A

REV	DESCRIPTION	ECO	DATE	BY
A	RELEASE TO PRODUCTION	28520	12/31/96	PEB

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES
PRODUCTION TOLERANCES
.X±.015 ANGULAR TOL.±2°
.XX±.010
.XXX±.005
SURFACE FINISH 63

SIGNATURE DATE
DRN BY: B.SMITH 12/17/96
ENGR:

MATERIAL:
FINISH:

DO NOT SCALE
REMOVE ALL BURRS
BREAK SHARP EDGES

THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION OF BIO-TEK INSTRUMENTS INC. AND NEITHER IT NOR THE INFORMATION CONTAINED THEREIN SHALL BE DISCLOSED TO OTHERS OR DUPLICATED OR USED FOR OTHERS WITHOUT EXPRESS WRITTEN CONSENT OF BIO-TEK INSTRUMENTS INC.

THIRD ANGLE PROJECTION

BIO-TEK INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404-0998

TITLE: MAIN PCB ASBY

SIZE D | DRAWING NO. 7330415-AS | REV A

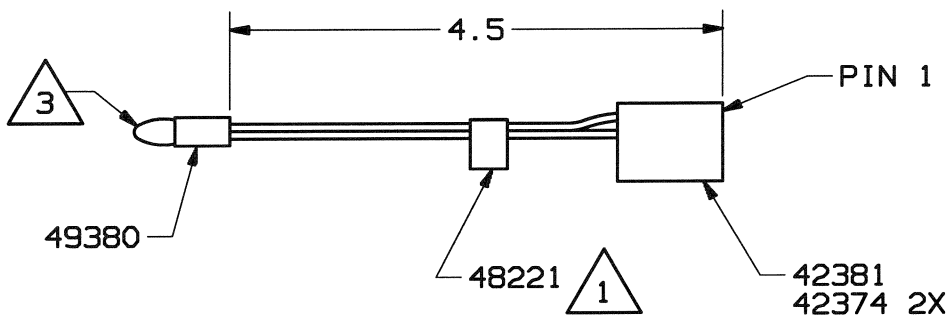
SCALE: NONE | SHEET 1 OF 1

NOTES:

1. MARK 7330501-C ON LABEL.
2. ALL UNTOLERANCED DIMENSIONS ARE ±.50".
3. DO NOT TOUCH LAMP WITH FINGERS.

WIRE LIST

CONN	PIN #	WIRE P/N	COLOR	GAUGE	CUT LENGTH REF.	CONN	PIN #
49380	1	---	---	---	3.75	42381	1
49380	2	---	---	---	3.75	42381	2



C

REV	DESCRIPTION	ECO	DATE	BY
C	CHG LENGTH FROM 4.0 TO 4.5	27904	9/5/96	PEB
B	CHG 42379 TO 42374; ADD NOTE 3	25679	11/15/94	BPS
A	RELEASE TO PRODUCTION	25466	9/13/94	BPS

UNLESS OTHERWISE SPECIFIED

ALL DIMENSIONS ARE IN INCHES
PRODUCTION TOLERANCES
.X±.015 ANGULAR TOL.±2°
.XX±.010
.XXX±.005
SURFACE FINISH 63

MATERIAL:

FINISH:

DO NOT SCALE | REMOVE ALL BURRS | BREAK SHARP EDGES

SIGNATURE		DATE
DRN BY:	B.SMITH	8/18/94
ENGR:	B.BEDARD	9/15/94

THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION OF BIO-TEK INSTRUMENTS INC. AND NEITHER IT NOR THE INFORMATION CONTAINED THEREIN SHALL BE DISCLOSED TO OTHERS OR DUPLICATED OR USED FOR OTHERS WITHOUT EXPRESS WRITTEN CONSENT OF BIO-TEK INSTRUMENTS INC.

THIRD ANGLE PROJECTION

BIO-TEK INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404-0998

TITLE:
CABLE, LAMP ASBY

SIZE	DRAWING NO.	REV
B	7330501-AS	C

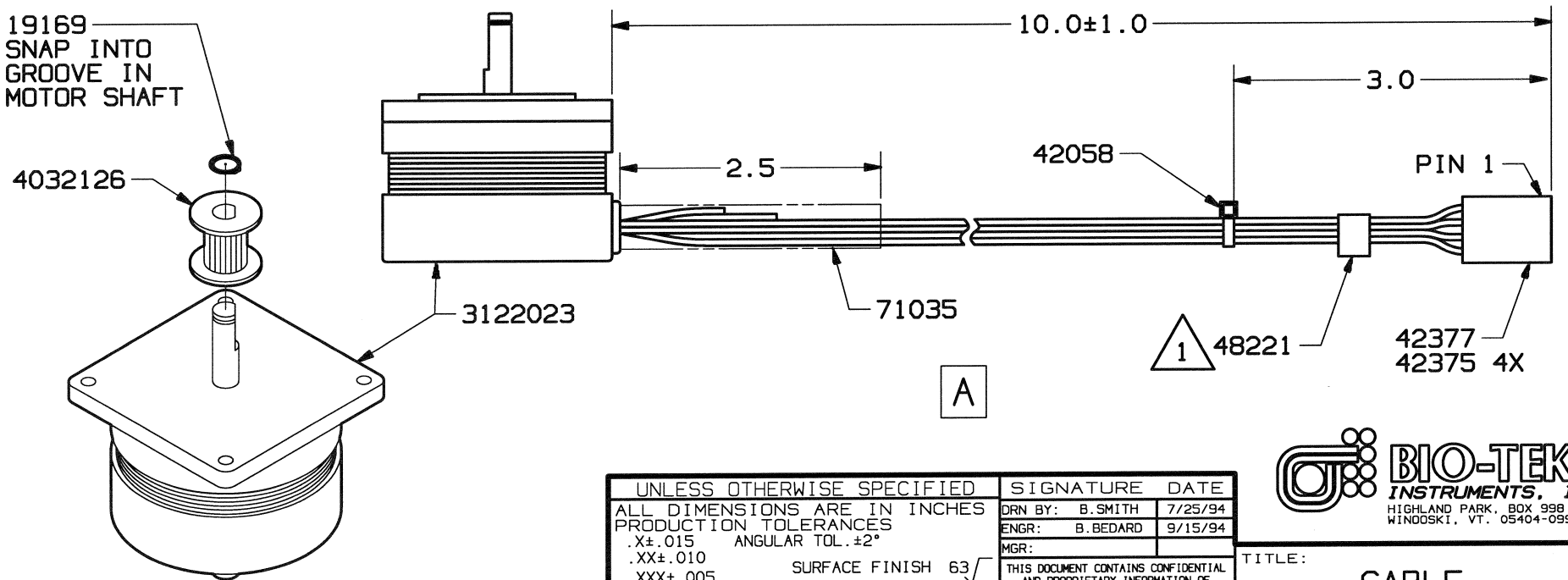
SCALE: 1/1 SHEET 1 OF 1

NOTES:

1. MARK 7330502-A ON LABEL.
2. ALL UNTOLERANCED DIMENSIONS ARE ±.50".

WIRE LIST

CONN	PIN #	WIRE P/N	COLOR	GAUGE	CUT LENGTH REF.	CONN	PIN #
3122023	—	—	GRN/WHT	22	9.5	42377	1
3122023	—	—	RED/WHT	22	9.5	42377	2
3122023	—	—	GRN	22	9.5	42377	3
3122023	—	—	RED	22	9.5	42377	4
3122023	—	—	WHT	22	1	—	—
3122023	—	—	BLK	22	1.5	—	—



REV	DESCRIPTION	ECO	DATE	BY
C	CHANGE LENGTHS PER ECO	26082	3/14/95	BPS
B	SWAP 2 & 3 ON 42377 CONN	25679	11/15/94	BPS
A	RELEASE TO PRODUCTION	25466	9/13/94	BPS

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES
PRODUCTION TOLERANCES
.X±.015 ANGULAR TOL.±2°
.XX±.010
.XXX±.005
SURFACE FINISH 63

MATERIAL:

FINISH:

DO NOT SCALE

REMOVE ALL BURRS

BREAK SHARP EDGES

SIGNATURE	DATE
DRN BY: B.SMITH	7/25/94
ENGR: B.BEDARD	9/15/94
MGR:	

THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION OF BIO-TEK INSTRUMENTS INC. AND NEITHER IT NOR THE INFORMATION CONTAINED THEREIN SHALL BE DISCLOSED TO OTHERS OR DUPLICATED OR USED FOR OTHERS WITHOUT EXPRESS WRITTEN CONSENT OF BIO-TEK INSTRUMENTS INC.

THIRD ANGLE PROJECTION

BIO-TEK INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404-0998

TITLE:
CABLE,
MOTOR Y AXIS

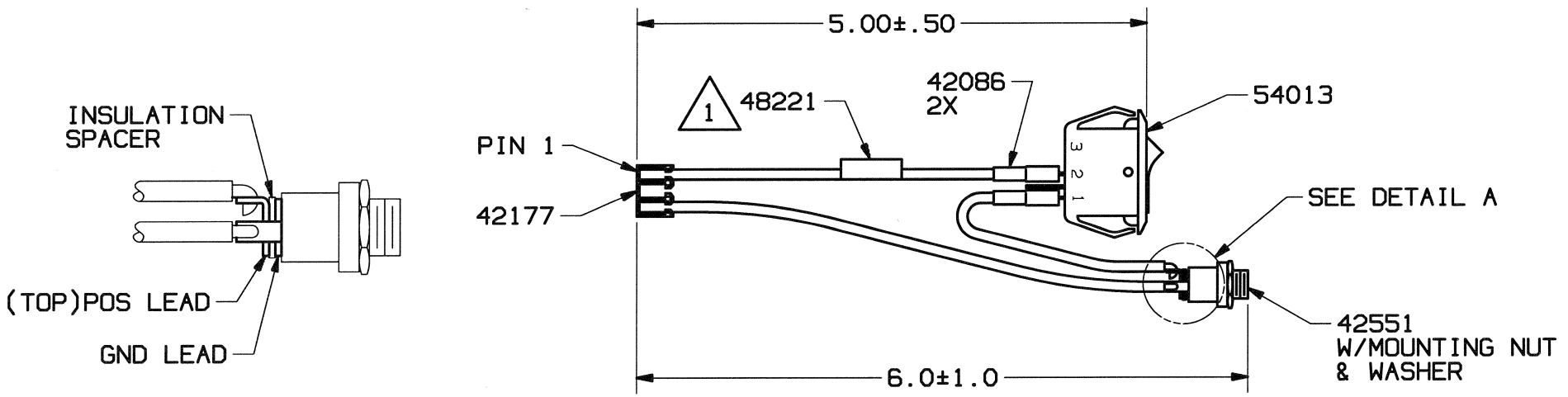
SIZE	DRAWING NO.	REV
B	7330502-AS	C

SCALE: 1/1 SHEET 1 OF 1

NOTES:

1. MARK 7330503-B ON LABEL.
2. ALL UNTOLERANCED DIMENSIONS ARE ±.50".

WIRE LIST							
CONN	PIN #	WIRE P/N	COLOR	GAUGE	CUT LENGTH REF.	CONN	PIN #
54013	2	71093	RED	18	4.0	42177	1
54013	1	71093	RED	18	3.5	42551	POS
42551	GND	71093	RED	18	5.0	42177	3



DETAIL A

NOTE: SOME CONNECTORS MAY HAVE A THIRD LEAD ATTACHED TO 42551 BELOW THE FIRST TWO. THIS LEAD IS NOT USED.

B

REV	DESCRIPTION	ECO	DATE	BY
D	CHG WIRE:ADD NOTE	26931	11/28/95	BPS
C	CHG 2.5" TO 3.5"	26417	6/13/95	BPS
B	REVERSE 42177 CONN	25679	11/15/94	BPS
A	RELEASE TO PRODUCTION	25465	9/13/94	BPS

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES
PRODUCTION TOLERANCES
.X±.015 ANGULAR TOL.±2°
.XX±.010
.XXX±.005
SURFACE FINISH 63

MATERIAL:

FINISH:

DO NOT SCALE

REMOVE ALL BURRS

BREAK SHARP EDGES

SIGNATURE		DATE
DRN BY:	B.SMITH	7/26/94
ENGR:	B.BEDARD	9/15/94

THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION OF BIO-TEK INSTRUMENTS INC. AND NEITHER IT NOR THE INFORMATION CONTAINED THEREIN SHALL BE DISCLOSED TO OTHERS OR DUPLICATED OR USED FOR OTHERS WITHOUT EXPRESS WRITTEN CONSENT OF BIO-TEK INSTRUMENTS INC.

THIRD ANGLE PROJECTION

BIO-TEK INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404-0998

TITLE:
CABLE, POWER INPUT ASBY

SIZE	DRAWING NO.	REV
B	7330503-AS	D

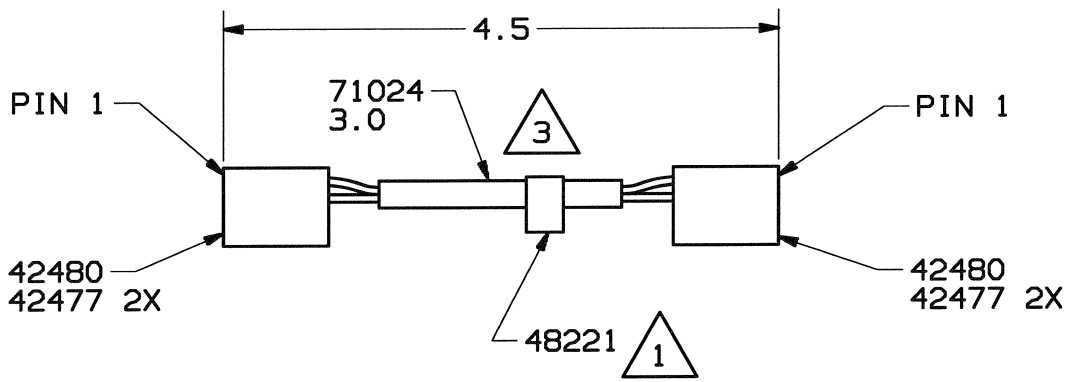
SCALE: 1/1 SHEET 1 OF 1

NOTES:

1. MARK 7330504-D ON LABEL.
2. ALL UNTOLERANCED DIMENSIONS ARE ±.50".
3. DO NOT SHRINK THIS TUBING.

WIRE LIST

CONN	PIN #	WIRE P/N	COLOR	GAUGE	CUT LENGTH REF.	CONN	PIN #
42480	1	71101	BLK	22	4	42480	1
42480	2	71108	BLU	22	4	42480	2
42480	3	---	---	---	---	42480	3
42480	4	---	---	---	---	42480	4



D

REV	DESCRIPTION	ECO	DATE	BY
D	ADD 71024:CHG ONE WIRE TO BLUE	27813	8/13/96	PEB
C	CHG 42377 TO 42480	25761	12/6/94	BPS
B	CHG 42377 TO 42480	25693	11/15/94	BPS
A	RELEASE TO PRODUCTION	25465	9/13/94	BPS

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES
PRODUCTION TOLERANCES
.X±.015 ANGULAR TOL.±2°
.XX±.010
.XXX±.005
SURFACE FINISH 63

MATERIAL:

FINISH:

DO NOT SCALE

REMOVE ALL BURRS

BREAK SHARP EDGES

SIGNATURE		DATE
DRN BY:	B.SMITH	8/18/94
ENGR:	B.BEDARD	9/15/94

THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION OF BIO-TEK INSTRUMENTS INC. AND NEITHER IT NOR THE INFORMATION CONTAINED THEREIN SHALL BE DISCLOSED TO OTHERS OR DUPLICATED OR USED FOR OTHERS WITHOUT EXPRESS WRITTEN CONSENT OF BIO-TEK INSTRUMENTS INC.

THIRD ANGLE PROJECTION

BIO-TEK INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404-0998

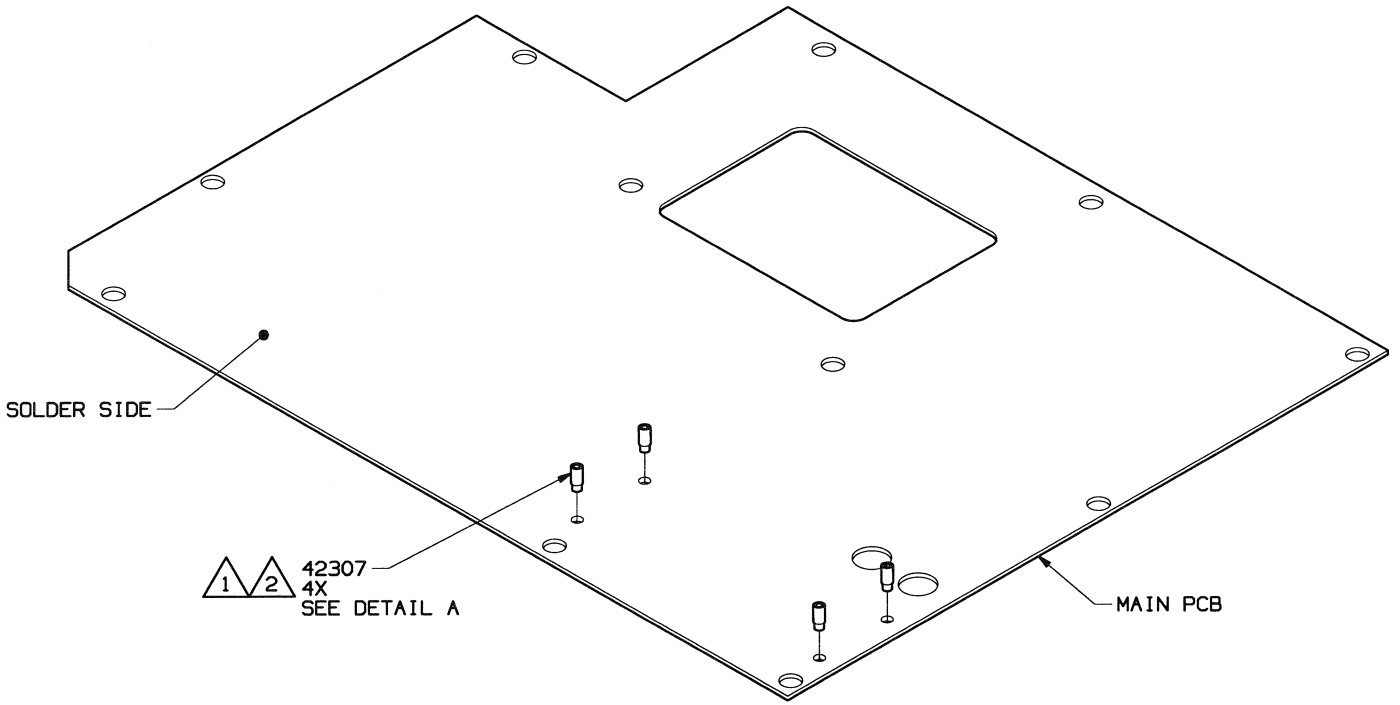
TITLE:
CABLE,
LAMP EXTENSION

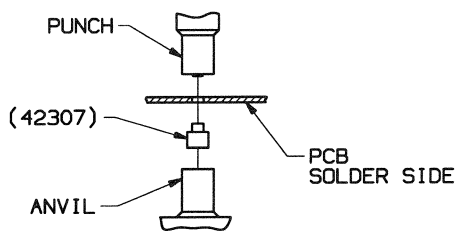
SIZE	DRAWING NO.	REV
B	7330504-AS	D

SCALE: 1/1 SHEET 1 OF 1

NOTES:

1. USE SWAGING JIG, 3362020, TO SWAGE 42307 TO PCB.
2. SWAGE MUST BE TIGHT TO PCB WITHOUT DAMAGING THE BOARD.





DETAIL A
PUNCH AND ANVIL
ARE PART OF
SWAGING JIG

REV	DESCRIPTION	ECO	DATE	BY
A	RELEASE TO PRODUCTION	25538	10/3/94	BPS

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES
PRODUCTION TOLERANCES
.X±.015 ANGULAR TOL.±2°
.XX±.010
.XXX±.005
SURFACE FINISH 63

SIGNATURE	DATE
DRN BY: B.SMITH	9/7/94
ENGR:	
MGR:	

MATERIAL:

FINISH:

DO NOT SCALE

REMOVE ALL BURRS

BREAK SHARP EDGES

THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION OF BIO-TEK INSTRUMENTS INC. AND NEITHER IT NOR THE INFORMATION CONTAINED THEREIN SHALL BE DISCLOSED TO OTHERS OR DUPLICATED OR USED FOR OTHERS WITHOUT EXPRESS WRITTEN CONSENT OF BIO-TEK INSTRUMENTS INC.

THIRD ANGLE PROJECTION

BIO-TEK INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404-0998

TITLE:
PCB
W/SWAGES ASBY

SIZE	DRAWING NO.	REV
C	7330505-AS	A

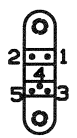
SCALE: 1/1 SHEET 1 OF 1

NOTES:

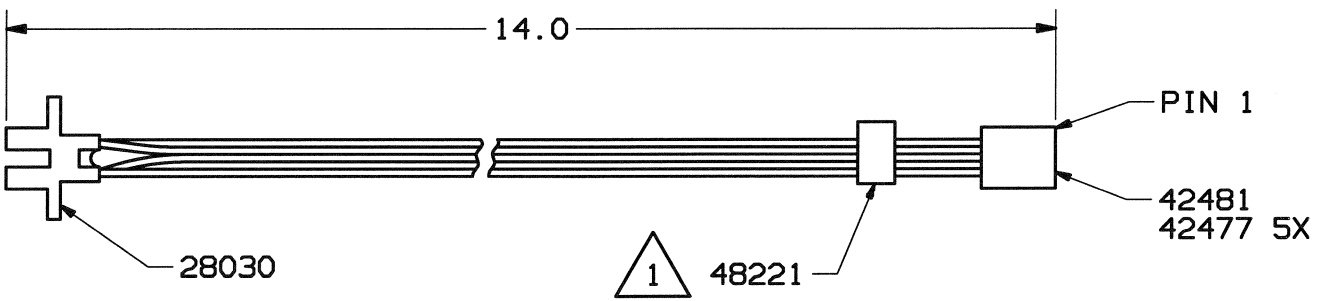
1. MARK 7330506-E ON LABEL.
2. ALL DIMENSIONS ARE ±.50" UNLESS OTHERWISE SPECIFIED.
3. TWIST WIRES APPROX. 1 TURN PER INCH PRIOR TO PLUGGING THE CONNECTOR.

WIRE LIST

CONN	OPTO LEAD #	WIRE P/N	COLOR	GAUGE	CUT LENGTH REF.	CONN	PIN #
28030	1	——	——	26	13.5	42481	2
28030	2	——	——	26	13.5	42481	1
28030	3	——	——	26	13.5	42481	3
28030	4	——	——	26	13.5	42481	4
28030	5	——	——	26	13.5	42481	5



OPTO BACK VIEW



E

REV	DESCRIPTION	ECO	DATE	BY
B	DEL:29107:ADD:28030	26841	10/25/95	BPS
A	RELEASE TO PRODUCTION	25467	9/13/94	BPS

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES
PRODUCTION TOLERANCES
.X±.015 ANGULAR TOL.±2°
.XX±.010
.XXX±.005
SURFACE FINISH 63

MATERIAL:

FINISH:

DO NOT SCALE

REMOVE ALL BURRS

BREAK SHARP EDGES

SIGNATURE	DATE
DRAWN BY:B.SMITH	8/18/94
ENGR: B.BEDARD	9/15/94
MGR:	

THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION OF BIO-TEK INSTRUMENTS INC. AND NEITHER IT NOR THE INFORMATION CONTAINED THEREIN SHALL BE DISCLOSED TO OTHERS OR DUPLICATED OR USED FOR OTHERS WITHOUT EXPRESS WRITTEN CONSENT OF BIO-TEK INSTRUMENTS INC.

THIRD ANGLE PROJECTION

BIO-TEK INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404-0998

TITLE:
CABLE OPTO, 14L ASBY

SIZE	DRAWING NO.	REV
B	7330506-AS	B

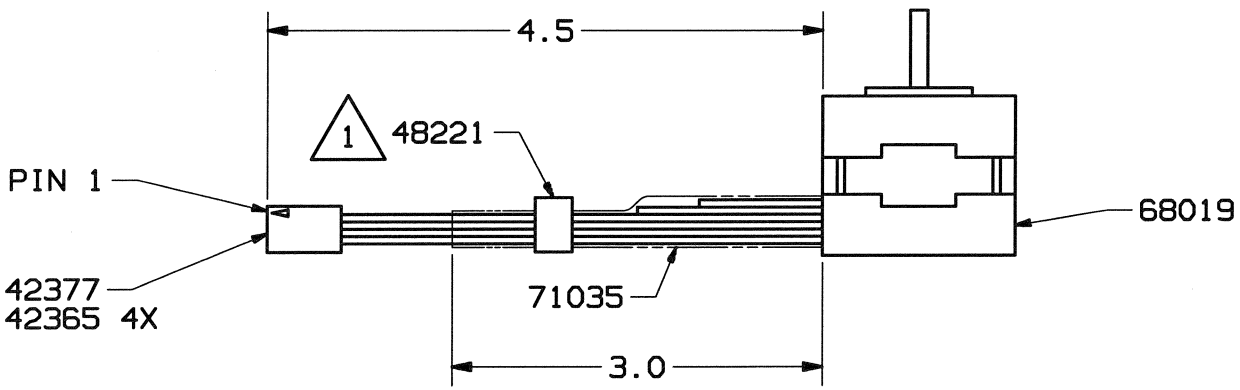
SCALE: 1/1 SHEET 1 OF 1

NOTES:

1. MARK 7330507-F ON LABEL.
2. ALL UNTOLERENCED DIMENSIONS ARE ±.50".

WIRE LIST

CONN	PIN #	WIRE P/N	COLOR	GAUGE	CUT LENGTH REF.	CONN	PIN #
MOTOR	——	——	YEL	26	4	42377	1
MOTOR	——	——	RED	26	4	42377	2
MOTOR	——	——	BLU	26	4	42377	3
MOTOR	——	——	WHT	26	4	42377	4
MOTOR	——	——	BRN	26	1.5	——	——
MOTOR	——	——	BRN	26	1	——	——



F

REV	DESCRIPTION	ECO	DATE	BY
A	RELEASE TO PRODUCTION	25575	10/18/94	BPS

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES
PRODUCTION TOLERANCES
.X±.015 ANGULAR TOL.±2°
.XX±.010
.XXX±.005
SURFACE FINISH 63

MATERIAL: IAW BOM

FINISH: NONE

DO NOT SCALE | REMOVE ALL BURRS | BREAK SHARP EDGES

SIGNATURE	DATE
DRAWN BY:B.SMITH	10/12/94
ENGR:	
MGR:	

THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION OF BIO-TEK INSTRUMENTS INC. AND NEITHER IT NOR THE INFORMATION CONTAINED THEREIN SHALL BE DISCLOSED TO OTHERS OR DUPLICATED OR USED FOR OTHERS WITHOUT EXPRESS WRITTEN CONSENT OF BIO-TEK INSTRUMENTS INC.

THIRD ANGLE PROJECTION

BIO-TEK INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404-0998

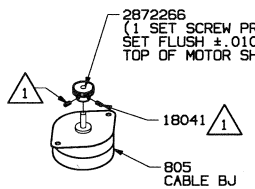
TITLE:
CABLE,
X-AXIS MOTOR

SIZE	DRAWING NO.	REV
B	7330507-AS	A

SCALE: 1/1 SHEET 1 OF 1

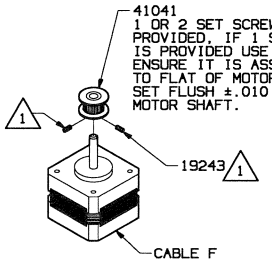
NOTES:

1. APPLY LOCTITE #242(66006) TO THREADS.
2. APPLY LOCTITE #405(66033) TO THREADS.

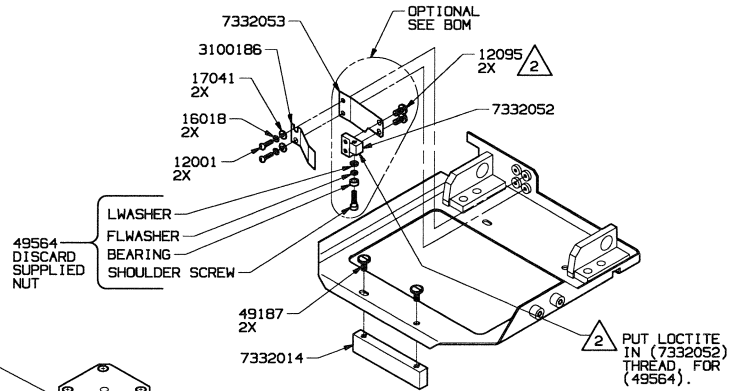


FILTER WHEEL
MOTOR ASBY

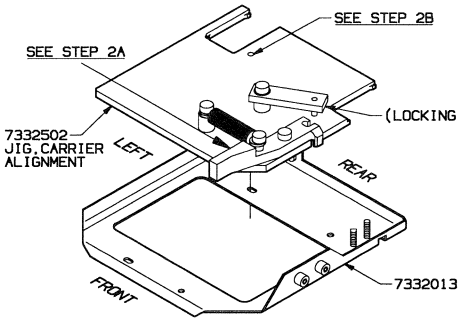
NOTE: PRE-ASSEMBLED PART, NOT PART OF CARRIER ASSEMBLY.

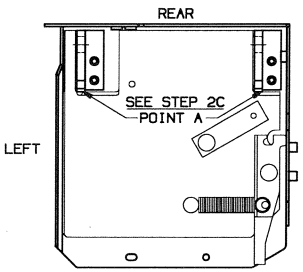

41041
1 OR 2 SET SCREWS MAY BE PROVIDED. IF 1 SET SCREW IS PROVIDED USE 19243 AND ENSURE IT IS ASSEMBLED TO FLAT OF MOTOR SHAFT & SET FLUSH ±.010 TO TOP OF MOTOR SHAFT.
19243
CABLE F

STEP 1



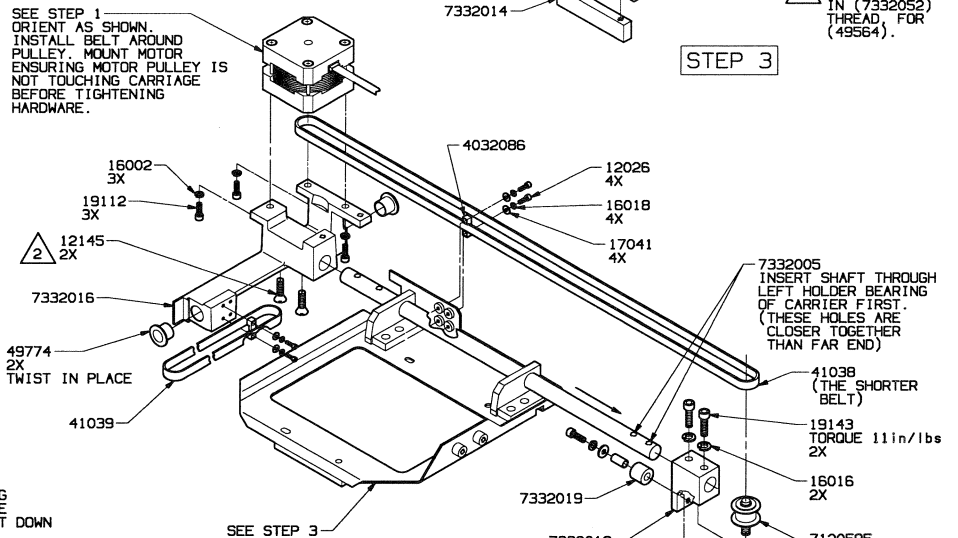
STEP 3





TOP VIEW

STEP 2



STEP 4

STEP 2 ASSEMBLY INSTRUCTIONS

STEP 2A: SET JIG 7332502 BY PUSHING ARM IN DIRECTION SHOWN. SWIVEL LOCKING ARM INTO NOTCH.

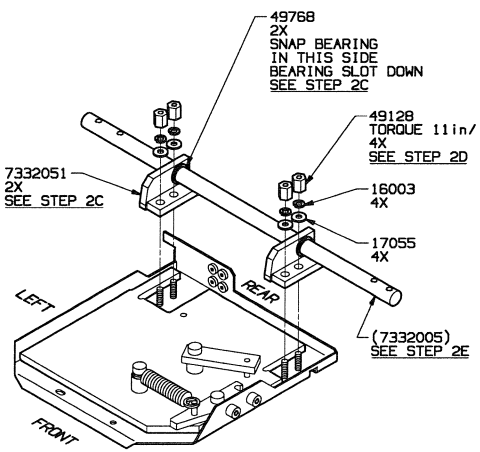
STEP 2B: PLACE JIG 7332502 INTO CARRIER,MICROPLATE (7332013) WITH DOWEL PIN INSERTED INTO SLOT IN CARRIER RELEASE LOCKING ARM FROM NOTCH.

STEP 2C: INSERT BEARINGS (49768) INTO HOLDER BEARING AS SHOWN (7332051 2X). ROTATE BEARING UNTIL SLOT IN BEARING IS DOWN. PLACE HOLDER BEARING (2X) ONTO CARRIER,MICROPLATE(7332013) STUDS. PUSH JIG TO REAR. LIGHTLY PUSH HOLDER AGAINST LEFT SIDE OF JIG AND TO THE FRONT. IF HOLDER IS HITTING THE STUDS BEFORE TOUCHING LEFT SIDE & POINTS "A". REJECT CARRIER MICROPLATE & START AT STEP 2A.

STEP 2D: ASSEMBLY HOLDER BEARING STARTING WITH RIGHT HOLDER. ALIGN HOLDER PER STEP 2C & TIGHTEN HARDWARE. REPEAT FOR LEFT HOLDER.

STEP 2E: INSERT SHAFT,X-AXIS (7332005) INTO HOLDER BEARING. THE SHAFT SHOULD SLIDE FREELY IN BEARINGS. IF SHAFT DOESN'T SLIDE FREELY REPEAT STEP 2D. REMOVE SHAFT,X-AXIS & SET ASIDE.

STEP 2F: RESET JIG 7332502 & REMOVE.



REV	DESCRIPTION	ECO	DATE	BY
C	COMBINE 7330508-AS & 7330514-AS	27183	2/5/96	BPS
B	ADD NOTE 3	27084	1/12/96	BPS
A	RELEASE TO PRODUCTION	26556	7/25/95	BPS

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES
PRODUCTION TOLERANCES
.XX±.010 ANGULAR TOL.±2°
.XXX±.005 SURFACE FINISH 63

SIGNATURE	DATE
DRN BY: B.SMITH	6/5/95
ENGR: B.BEDARD	6/26/95

MATERIAL: FINISH:

DO NOT SCALE | REMOVE ALL BURRS | BREAK SHARP EDGES

THIRD ANGLE PROJECTION

THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION OF BIO-TEK INSTRUMENTS, INC. AND NEITHER IT NOR THE INFORMATION CONTAINED THEREIN SHALL BE DISCLOSED TO OTHERS OR DUPLICATED OR USED FOR OTHERS WITHOUT EXPRESS WRITTEN CONSENT OF BIO-TEK INSTRUMENTS, INC.

BIO-TEK INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404-0998

TITLE:
MECH
PRE-ASSEMBLED ASBY

SIZE	DRAWING NO.	REV
D	7330508-AS	C

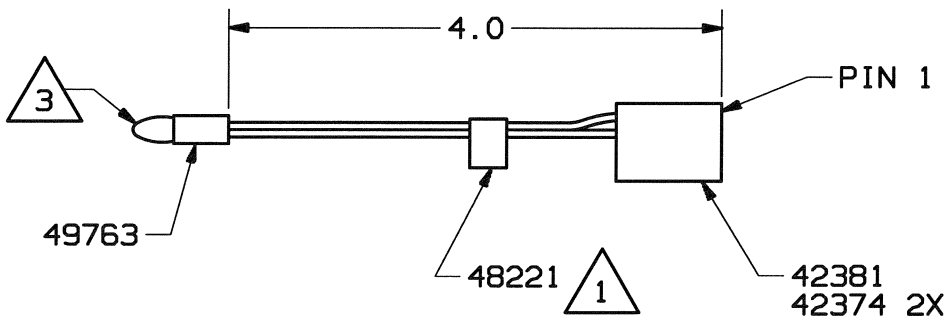
SCALE: 3/4 SHEET 1 OF 1

NOTES:

1. MARK 7330509-G ON LABEL.
2. ALL UNTOLERANCED DIMENSIONS ARE ±.50".
3. DO NOT TOUCH LAMP WITH FINGERS.

WIRE LIST

CONN	PIN #	WIRE P/N	COLOR	GAUGE	CUT LENGTH REF.	CONN	PIN #
49763	1	---	---	---	3.75	42381	1
49763	2	---	---	---	3.75	42381	2



G

REV	DESCRIPTION	ECO	DATE	BY
A	RELEASE TO PRODUCTION	26246	4/25/95	BPS

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES
PRODUCTION TOLERANCES
.X±.015 ANGULAR TOL.±2°
.XX±.010
.XXX±.005
SURFACE FINISH 63

MATERIAL:

FINISH:

DO NOT SCALE

REMOVE ALL BURRS

BREAK SHARP EDGES

SIGNATURE	DATE
DRN BY: B.SMITH	8/18/94
ENGR:	
MGR:	

THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION OF BIO-TEK INSTRUMENTS INC. AND NEITHER IT NOR THE INFORMATION CONTAINED THEREIN SHALL BE DISCLOSED TO OTHERS OR DUPLICATED OR USED FOR OTHERS WITHOUT EXPRESS WRITTEN CONSENT OF BIO-TEK INSTRUMENTS INC.

THIRD ANGLE PROJECTION

BIO-TEK INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404-0998

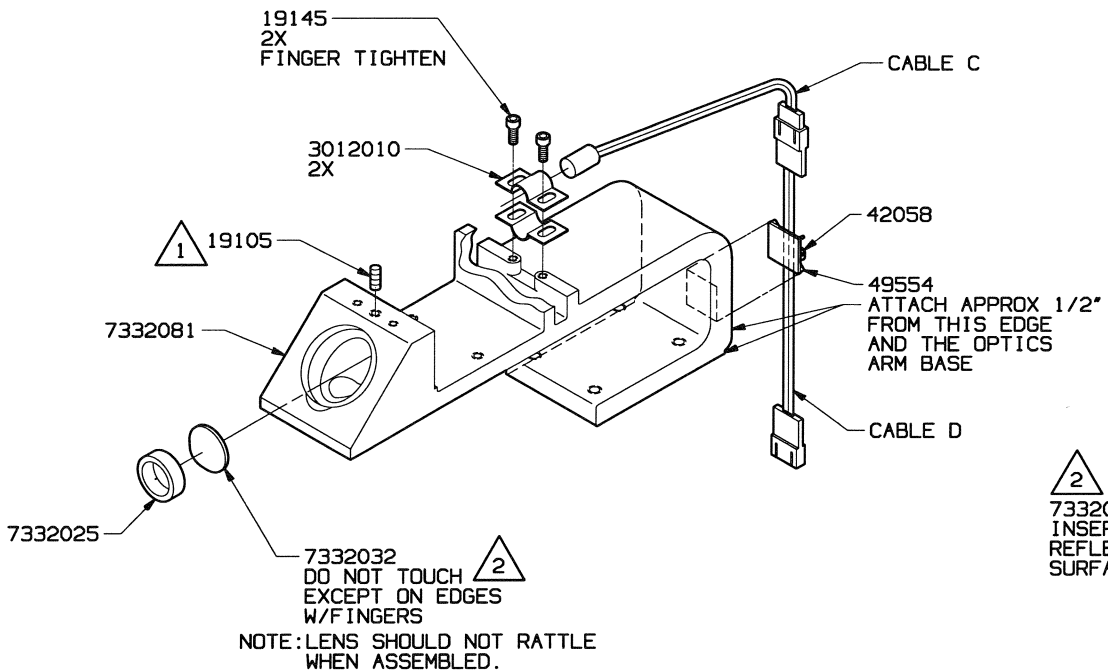
TITLE:
CABLE,
LAMP UV ASBY

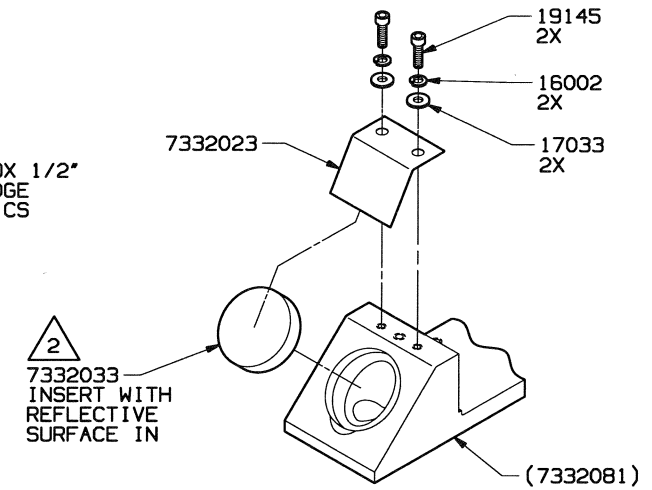
SIZE	DRAWING NO.	REV
B	7330509-AS	A

SCALE: 1/1 SHEET 1 OF 1

NOTES:

1. APPLY LOCTITE #242(66006) TO THREADS.
2. CLEAN WITH LENS PAPER. IF NEEDED. MUST BE FREE OF DUST OR FINGERPRINTS.





OPTIC ARM ASBY

REV	DESCRIPTION	ECO	DATE	BY
B	CHG VIEW & MTG LOCATION OF 49554	28351	11/20/96	BPS
A	RELEASE TO PRODUCTION	27082	1/12/96	BPS

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES
PRODUCTION TOLERANCES
.X±.015 ANGULAR TOL. ±2°
.XX±.010
.XXX±.005
SURFACE FINISH 63

SIGNATURE	DATE
DRN BY: B.SMITH	1-5-96
ENGR: B.BEDARD	1/15/96

MATERIAL:

FINISH:

DO NOT SCALE

REMOVE ALL BURRS

BREAK SHARP EDGES

THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION OF BIO-TEK INSTRUMENTS INC. AND NEITHER IT NOR THE INFORMATION CONTAINED THEREIN SHALL BE DISCLOSED TO OTHERS OR DUPLICATED OR USED FOR OTHERS WITHOUT EXPRESS WRITTEN CONSENT OF BIO-TEK INSTRUMENTS INC.

THIRD ANGLE PROJECTION

BIO-TEK INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404-0998

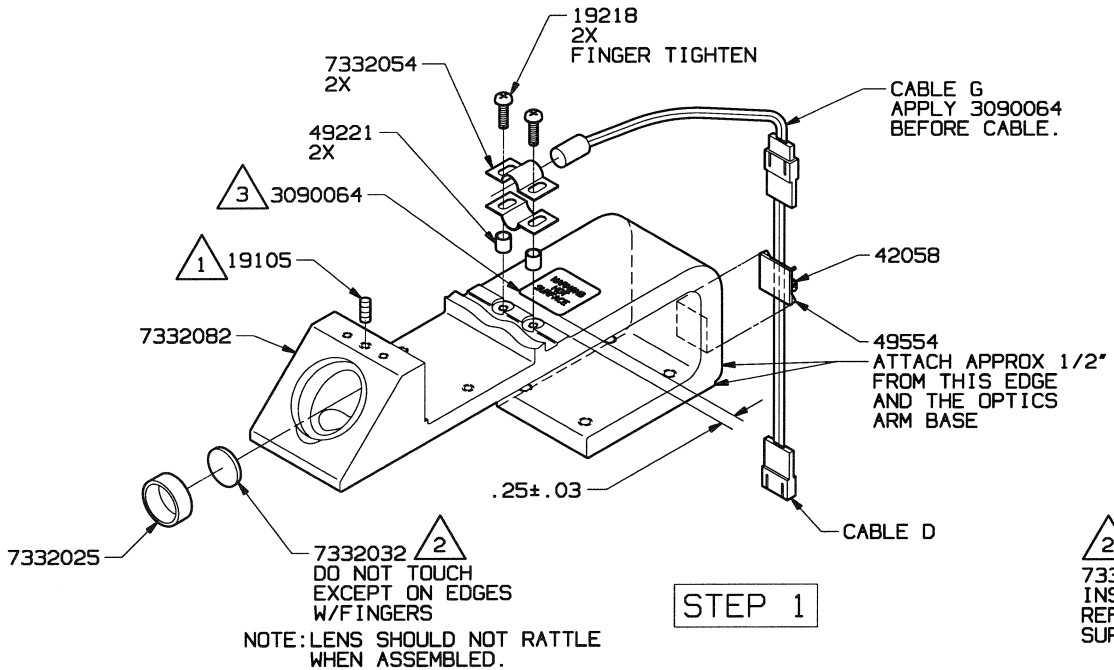
TITLE: OPTIC ARM ASBY

SIZE	DRAWING NO.	REV
C	7330522-AS	B

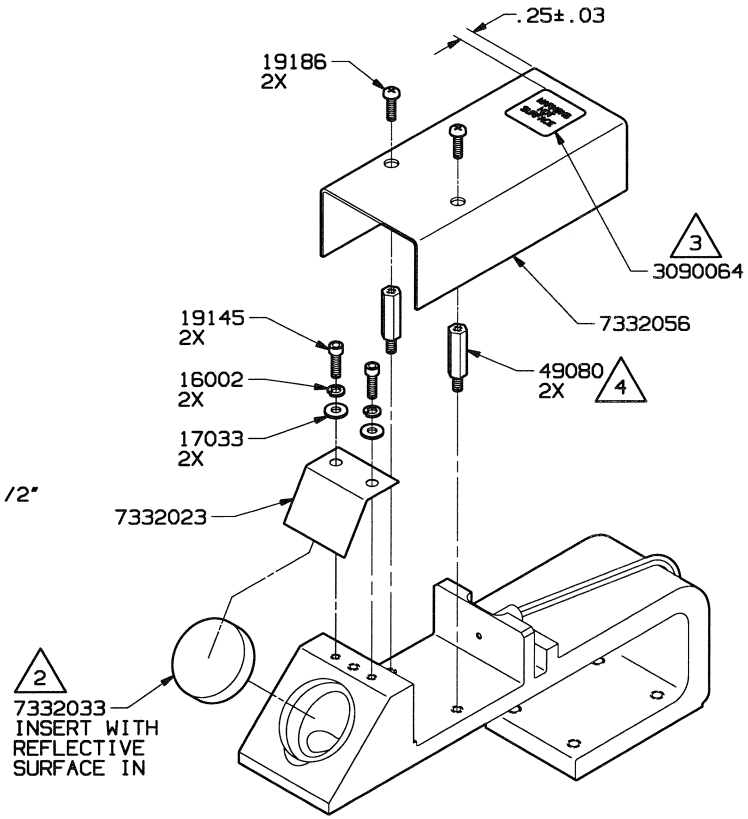
SCALE: 1/1 SHEET 1 OF 1

NOTES:

1. APPLY LOCTITE #242(66006) TO THREADS.
2. CLEAN WITH LENS PAPER, IF NEEDED. MUST BE FREE OF DUST OR FINGERPRINTS.
3. WIPE SURFACE WITH ALCOHOL BEFORE APPLYING.
4. APPLY LOCTITE #405(66033) TO THREADS.



STEP 1



STEP 2

REV	DESCRIPTION	ECO	DATE	BY
B	CHG VIEW & MTG LOCATION OF 49554	28351	11/20/96	BPS
A	RELEASE TO PRODUCTION	27082	1/12/96	BPS

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES
PRODUCTION TOLERANCES
.X±.015 ANGULAR TOL.±2°
.XX±.010
.XXX±.005
SURFACE FINISH 63

SIGNATURE	DATE
DRN BY: B.SMITH	1-6-96
ENGR: B.BEDARD	1/15/96

MATERIAL:
FINISH:

DO NOT SCALE | REMOVE ALL BURRS | BREAK SHARP EDGES

THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION OF BIO-TEK INSTRUMENTS INC. AND NEITHER IT NOR THE INFORMATION CONTAINED THEREIN SHALL BE DISCLOSED TO OTHERS OR DUPLICATED OR USED FOR OTHERS WITHOUT EXPRESS WRITTEN CONSENT OF BIO-TEK INSTRUMENTS INC.

THIRD ANGLE PROJECTION

BIO-TEK INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404-0998

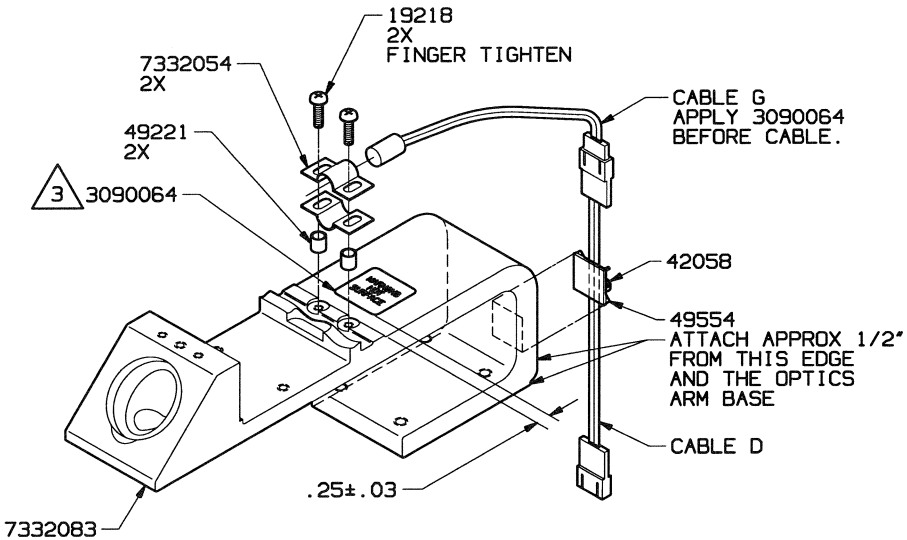
TITLE:
OPTIC ARM
UV ASBY

SIZE	DRAWING NO.	REV
C	7330523-AS	B

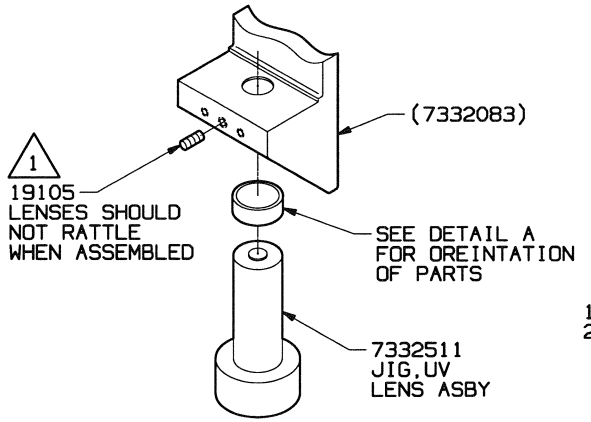
SCALE: 1/1 SHEET 1 OF 1

NOTES:

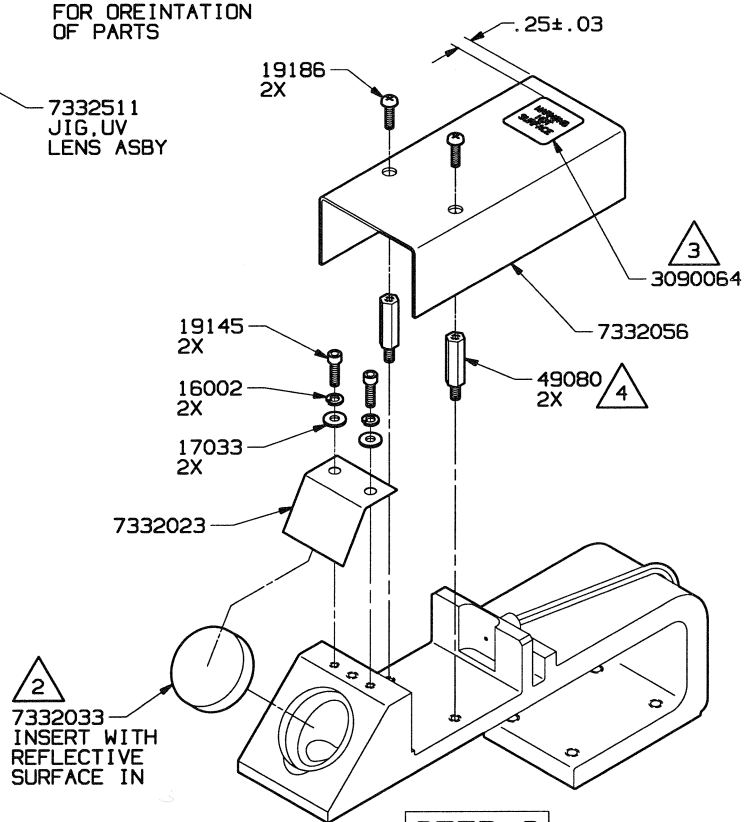
1. APPLY LOCTITE #242(66006) TO THREADS.
2. CLEAN WITH LENS PAPER, IF NEEDED. MUST BE FREE OF DUST OR FINGERPRINTS.
3. WIPE SURFACE WITH ALCOHOL BEFORE APPLYING.
4. APPLY LOCTITE #405(66033) TO THREADS.



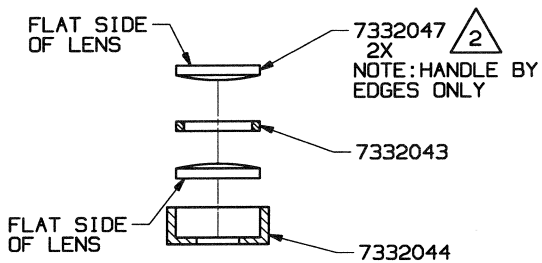
STEP 1



STEP 2



STEP 3



DETAIL A

REV	DESCRIPTION	ECO	DATE	BY
B	CHG VIEW & MTG LOCATION OF 49554	28351	11/20/96	BPS
A	RELEASE TO PRODUCTION	27082	1/12/96	BPS

UNLESS OTHERWISE SPECIFIED	SIGNATURE	DATE
ALL DIMENSIONS ARE IN INCHES	DRN BY: B.SMITH	1-5-96
PRODUCTION TOLERANCES	ENGR: B.BEDARD	1/15/96
.X±.015 ANGULAR TOL.±2°		
.XX±.010		
.XXX±.005 SURFACE FINISH 63		
MATERIAL:	FINISH:	
DO NOT SCALE	REMOVE ALL BURRS	BREAK SHARP EDGES

THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION OF BIO-TEK INSTRUMENTS INC. AND NEITHER IT NOR THE INFORMATION CONTAINED THEREIN SHALL BE DISCLOSED TO OTHERS OR DUPLICATED OR USED FOR OTHERS WITHOUT EXPRESS WRITTEN CONSENT OF BIO-TEK INSTRUMENTS INC.

THIRD ANGLE PROJECTION

BIO-TEK INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404-0998

TITLE:
OPTIC ARM
NARROW BEAM ASBY

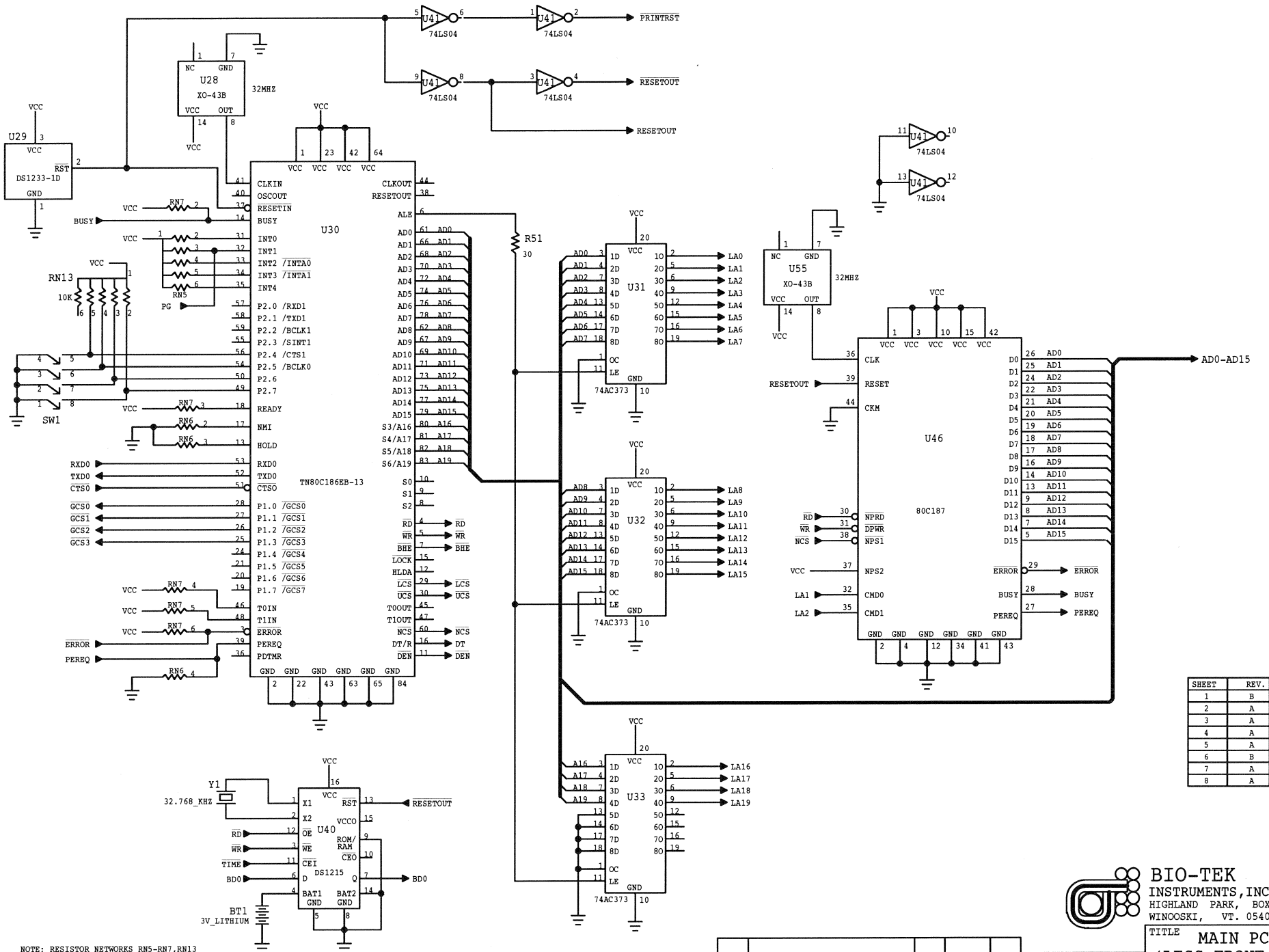
SIZE	DRAWING NO.	REV
C	7330524-AS	B

SCALE: 1/1 SHEET 1 OF 1

Schematic Diagrams

The following are the schematic diagrams describing the electrical circuits within the *ELx800* and its variations. These again are subject to change.

7330410-SC MAIN PCB ASBY
7330401-SC MOVING INTCON PCB ASBY
7330415-SC
7330414-SC
7330413-SC



NOTE; RESISTOR NETWORKS RN5-RN7,RN13 HAVE A VALUE OF 10K.

SHEET	REV.
1	B
2	A
3	A
4	A
5	A
6	B
7	A
8	A

BIO-TEK
INSTRUMENTS,INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404- 0998

REV	DESCRIPTION	ECO	DATE	BY
B	SHT6:CHG 1.26MHZ TO 2.0MHZ	28207	10/30/96	
A	RELEASE TO PRODUCTION	26880	11/14/95	

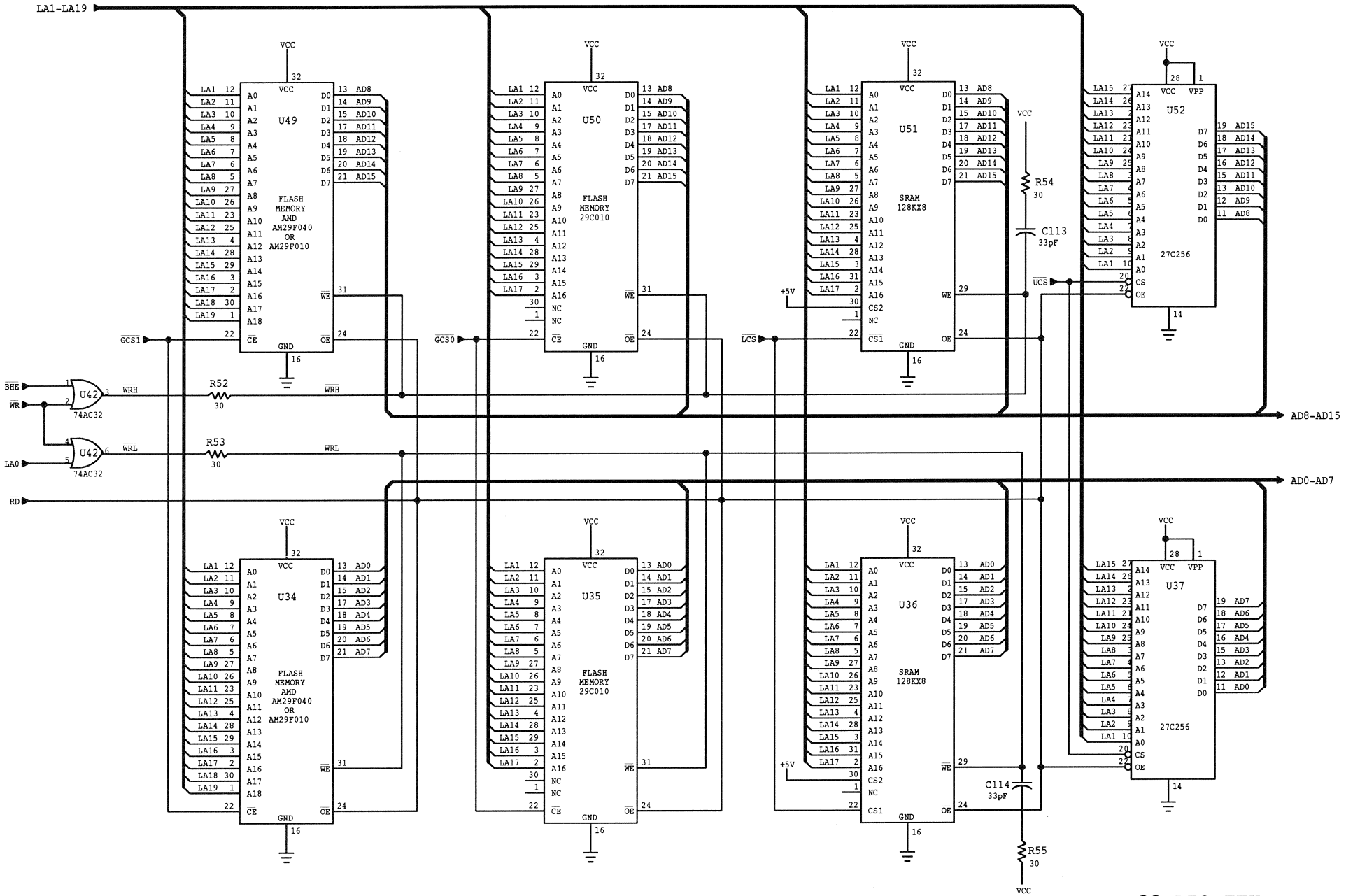
APPROVALS	DATE
DRAWN GFW	07/94
CHECKED	

TITLE MAIN PCB (LESS FRONT END)

SCALE

DRAWING# 7330410-SC

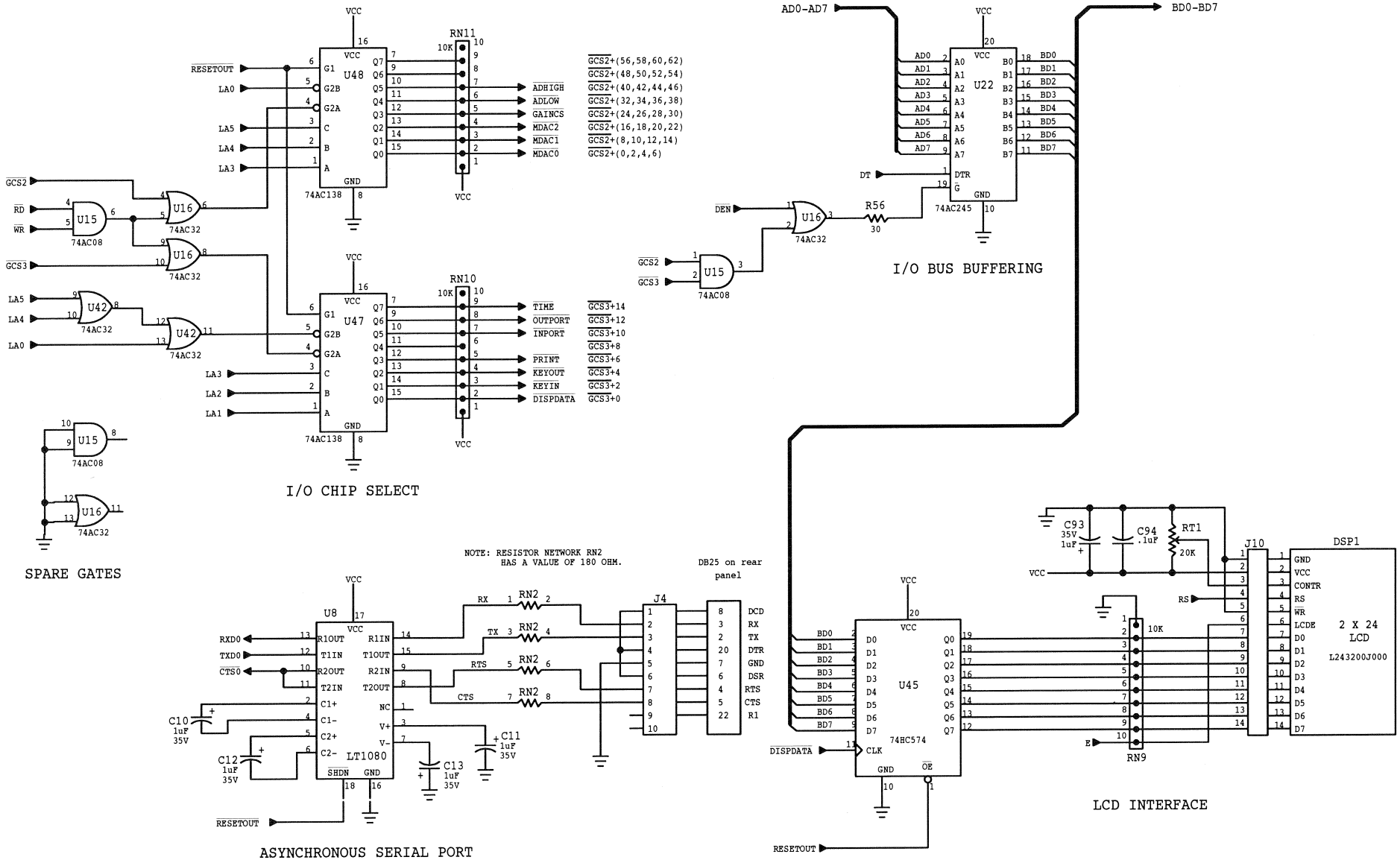
SHEET 1OF 8



REV A

BIO-TEK
INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404- 0998

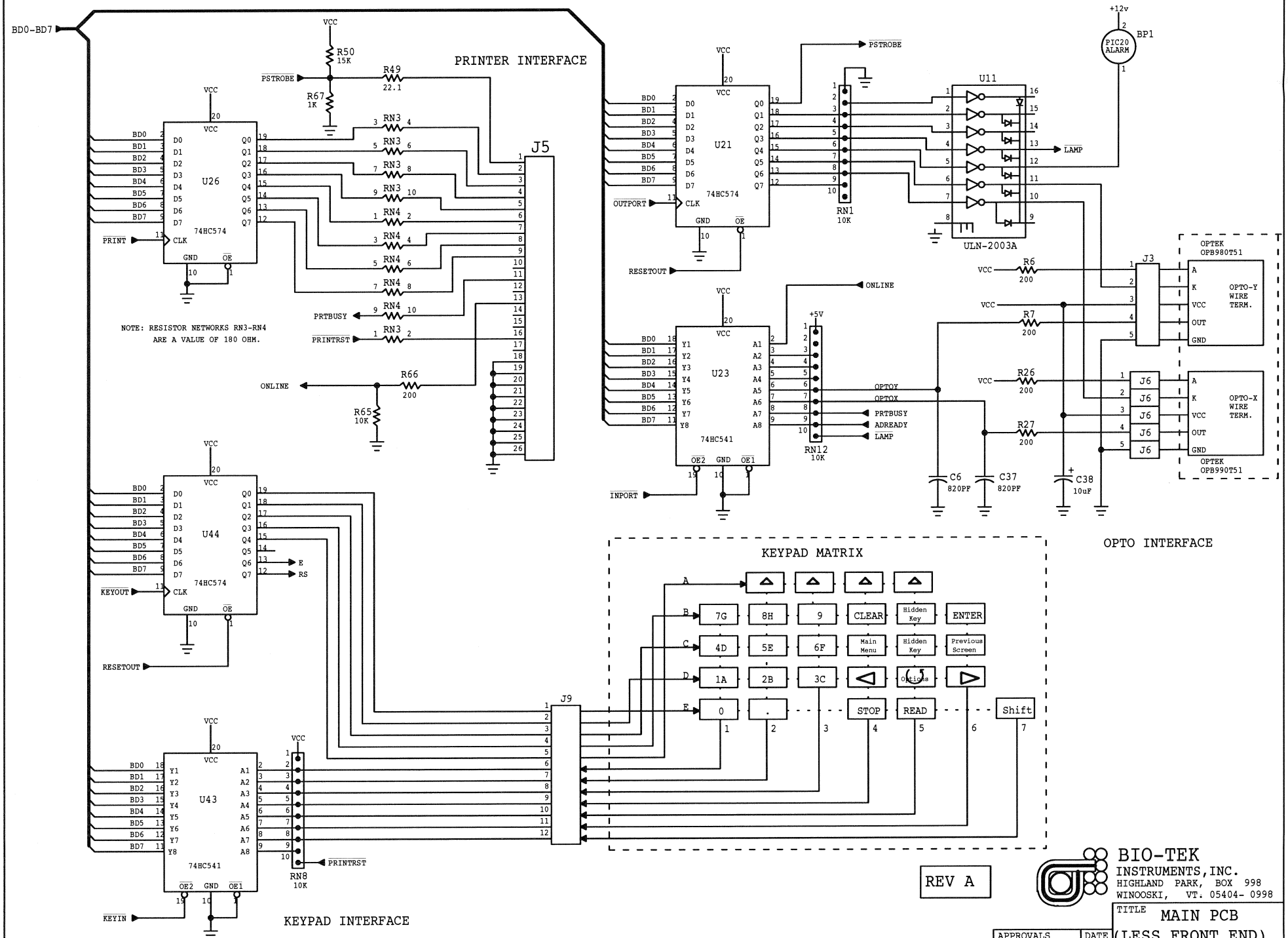
TITLE	MAIN PCB (LESS FRONT END)		
APPROVALS	DATE		
DRAWN GFW	7/94	SCALE	DRAWING#
CHECKED		SHEET 2OF 8	7330410-SC

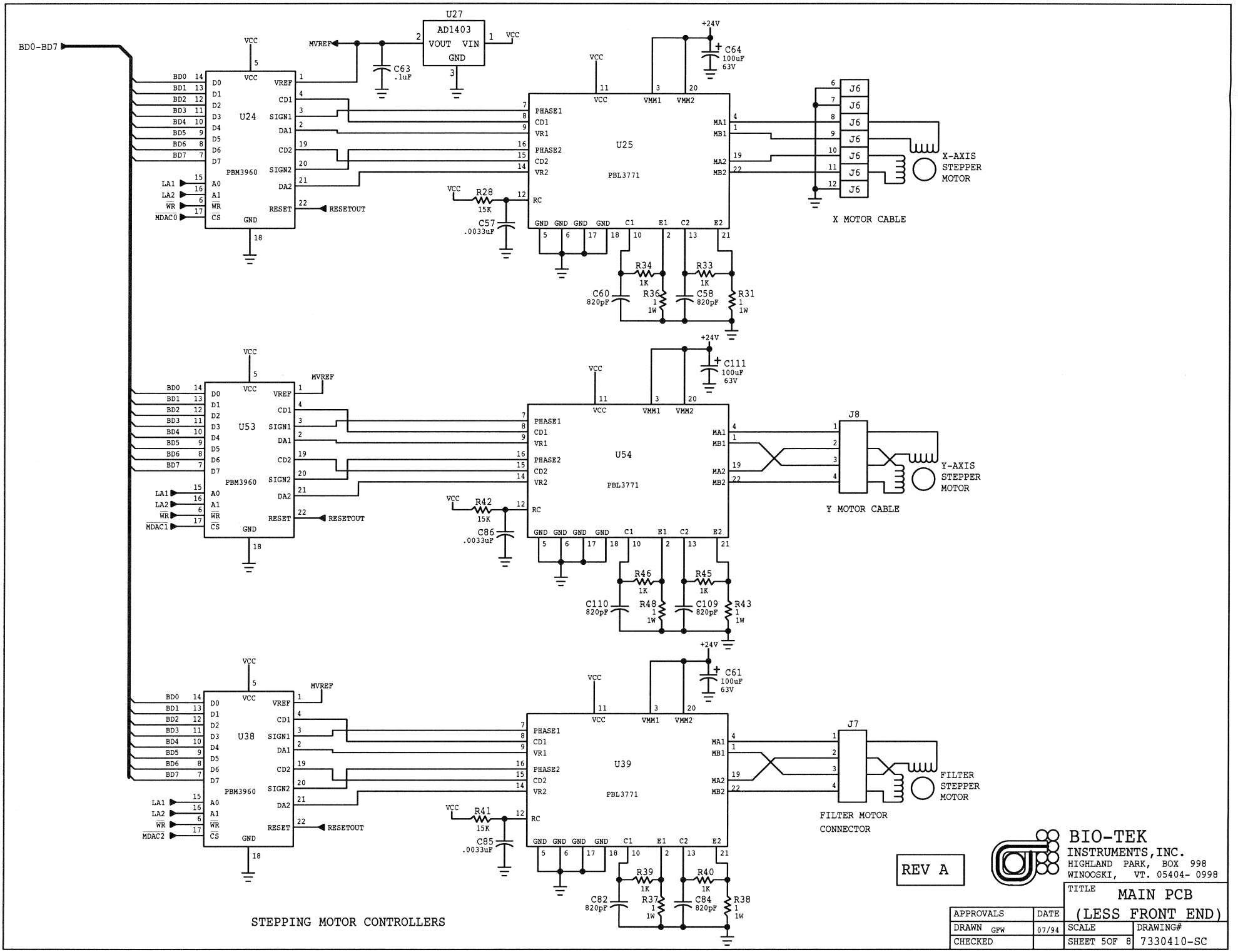


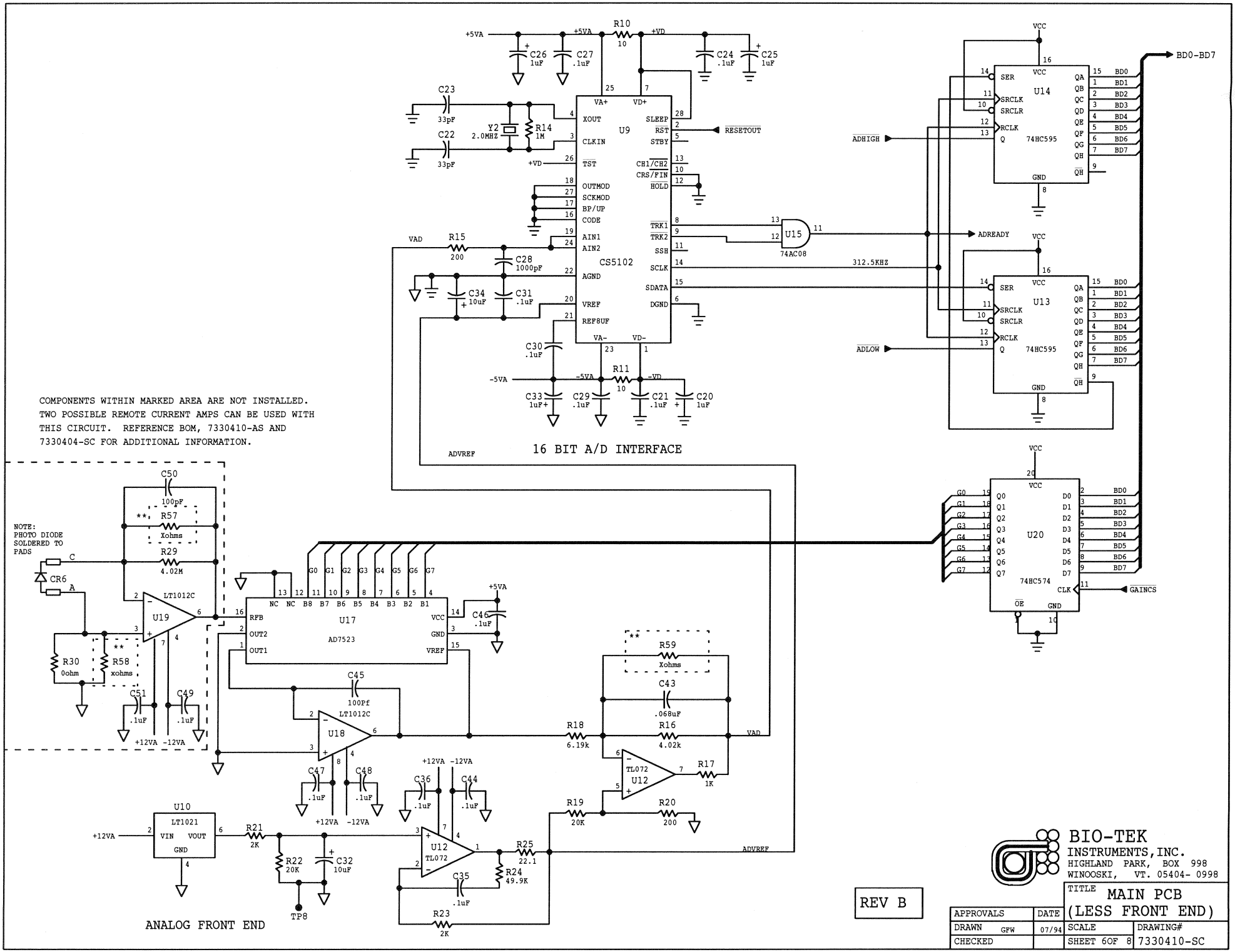
REV A

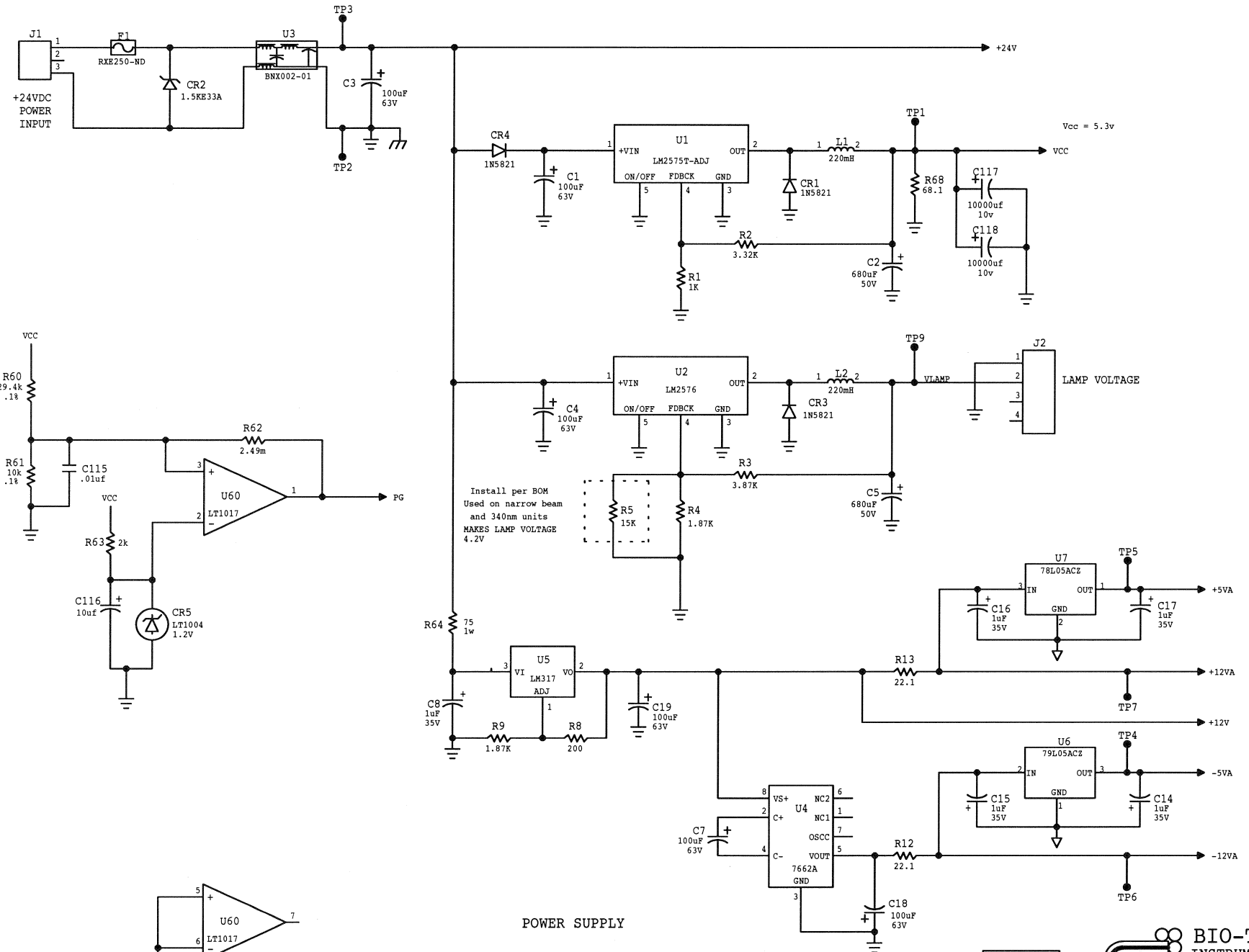
BIO-TEK
INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404- 0998

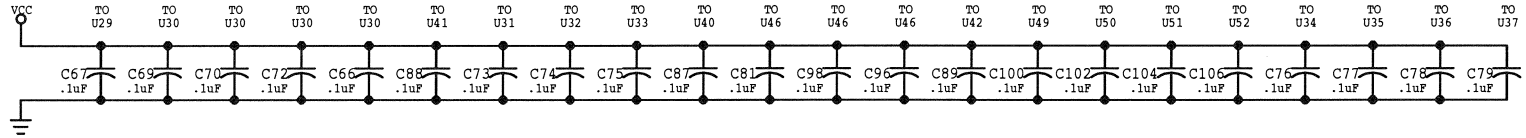
TITLE	MAIN PCB (LESS FRONT END)		
APPROVALS	DATE		
DRAWN GFW	07/94	SCALE	DRAWING#
CHECKED		SHEET 3OF 8	7330410-SC

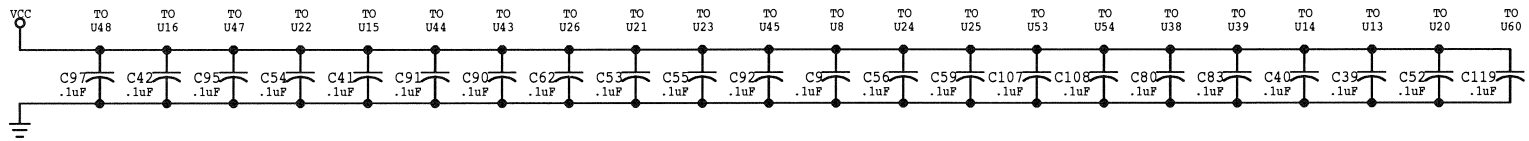

BD0-BD7
PRINTER INTERFACE
VCC
R50
15K
PSTROBE
R49
22.1
R67
1K
U26
74HC574
PRINT
RN3
RN4
J5
NOTE: RESISTOR NETWORKS RN3-RN4
ARE A VALUE OF 180 OHM.
PRTBUSY
PRINTRST
ONLINE
R66
200
R65
10K
U21
OUTPORT
RESETOUT
PSTROBE
U11
ULN-2003A
LAMP
RN1
10K
+12v
BP1
PIC20
ALARM
U23
74HC541
INPORT
+5V
RN12
10K
OPTOY
OPTOX
PRTBUSY
ADREADY
LAMP
R6
R7
R26
R27
200
J3
J6
OPTEK
OPB980T51
OPTO-Y
WIRE
TERM.
OPTO-X
WIRE
TERM.
OPTEK
OPB990T51
C6
820PF
C37
820PF
C38
10uF
OPTO INTERFACE
U44
KEYOUT
E
RS
RESETOUT
KEYPAD MATRIX
J9
7G
8H
9
CLEAR
Hidden Key
ENTER
4D
5E
6F
Main Menu
Hidden Key
Previous Screen
1A
2B
3C
Options
0
.
STOP
READ
Shift
U43
74HC541
RN8
10K
PRINTRST
KEYIN
KEYPAD INTERFACE
REV A
BIO-TEK
INSTRUMENTS,INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404- 0998
TITLE
MAIN PCB
(LESS FRONT END)
APPROVALS
DATE
DRAWN GFW
07/94
SCALE
DRAWING#
CHECKED
SHEET 4 OF 8
7330410-SC

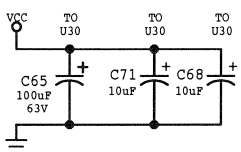

BD0-BD7
U27
AD1403
VOUT VIN
GND
MVREF
C63
.1uF
VCC
+24V
C64
100uF
63V
U24
PBM3960
U25
PBL3771
PHASE1
CD1
VR1
PHASE2
CD2
VR2
RC
VCC
VMM1
VMM2
MA1
MB1
MA2
MB2
GND
C1
E1
C2
E2
R28
15K
C57
.0033uF
R34
1K
R33
1K
C60
820pF
R36
1
1W
C58
820pF
R31
1
1W
J6
X-AXIS
STEPPER
MOTOR
X MOTOR CABLE
LA1
LA2
WR
MDAC0
RESETOUT
U53
U54
C111
100uF
63V
R42
15K
C86
.0033uF
R46
1K
R45
1K
C110
820pF
R48
1
1W
C109
820pF
R43
1
1W
J8
Y-AXIS
STEPPER
MOTOR
Y MOTOR CABLE
MDAC1
U38
U39
C61
100uF
63V
R41
15K
C85
.0033uF
R39
1K
R40
1K
C82
820pF
R37
1
1W
C84
820pF
R38
1
1W
J7
FILTER
STEPPER
MOTOR
FILTER MOTOR
CONNECTOR
MDAC2
STEPPING MOTOR CONTROLLERS
REV A
BIO-TEK
INSTRUMENTS,INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404- 0998
TITLE
MAIN PCB
(LESS FRONT END)
APPROVALS
DATE
DRAWN GFW
07/94
CHECKED
SCALE
DRAWING#
SHEET 5OF 8
7330410-SC

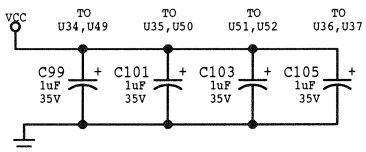

COMPONENTS WITHIN MARKED AREA ARE NOT INSTALLED.
TWO POSSIBLE REMOTE CURRENT AMPS CAN BE USED WITH
THIS CIRCUIT. REFERENCE BOM, 7330410-AS AND
7330404-SC FOR ADDITIONAL INFORMATION.
16 BIT A/D INTERFACE
ANALOG FRONT END
CS5102
AD7523
74HC595
74HC574
74AC08
LT1012C
LT1021
TL072
BD0-BD7
ADHIGH
ADLOW
ADREADY
312.5KHZ
RESETOUT
GAINCS
ADVREF
VAD
REV B
BIO-TEK
INSTRUMENTS,INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404- 0998
TITLE
MAIN PCB
(LESS FRONT END)
APPROVALS
DATE
DRAWN GFW
07/94
CHECKED
SCALE
SHEET 6OF 8
DRAWING#
7330410-SC


J1
F1
RXE250-ND
U3
BNX002-01
TP3
TP2
+24V
+24VDC
POWER
INPUT
CR2
1.5KE33A
C3
100uF
63V
CR4
1N5821
C1
100uF
63V
U1
+VIN
LM2575T-ADJ
OUT
ON/OFF
FDBCK
GND
L1
220mH
TP1
Vcc = 5.3v
VCC
CR1
1N5821
R68
68.1
C117
10000uf
10v
C118
10000uf
10v
R2
3.32K
R1
1K
C2
680uF
50V
TP9
J2
U2
LM2576
C4
100uF
63V
CR3
1N5821
L2
220mH
VLAMP
LAMP VOLTAGE
R3
3.87K
C5
680uF
50V
Install per BOM
Used on narrow beam
and 340nm units
MAKES LAMP VOLTAGE
4.2V
R5
15K
R4
1.87K
R60
29.4k
.1%
R61
10k
.1%
C115
.01uf
R62
2.49m
U60
LT1017
PG
R63
2k
C116
10uf
CR5
LT1004
1.2V
R64
75
1w
U5
LM317
ADJ
VI
VO
C8
1uF
35V
C19
100uF
63V
R9
1.87K
R8
200
U7
78L05ACZ
IN
OUT
GND
TP5
+5VA
C16
1uF
35V
C17
1uF
35V
R13
22.1
+12VA
TP7
+12V
U6
79L05ACZ
TP4
-5VA
C15
1uF
35V
C14
1uF
35V
U4
VS+
C+
C-
NC2
NC1
OSCC
VOUT
7662A
GND
C7
100uF
63V
R12
22.1
-12VA
TP6
C18
100uF
63V
U60
LT1017
POWER SUPPLY
REV A
BIO-TEK
INSTRUMENTS,INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404- 0998
TITLE
MAIN PCB
(LESS FRONT END)
APPROVALS
DATE
DRAWN GFW
07/94
CHECKED
SCALE
DRAWING#
SHEET 7OF 8
7330410-SC







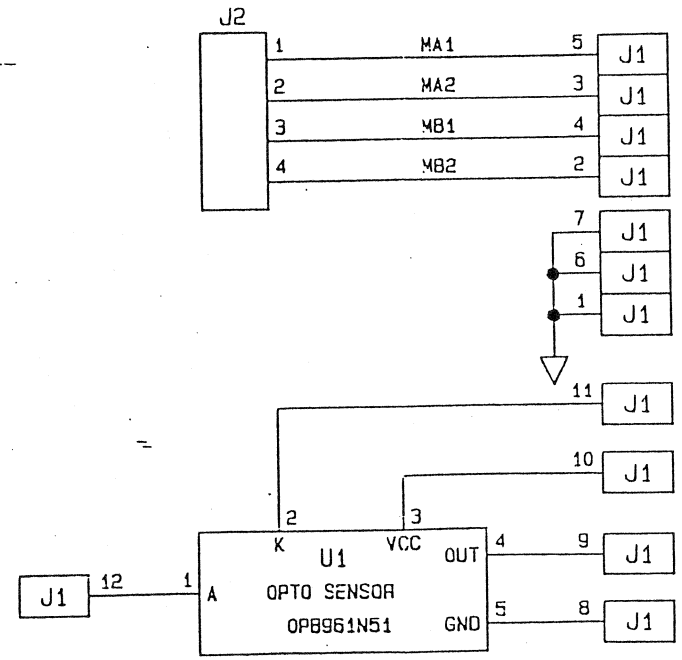


BYPASS CAPACITORS

REV A

BIO-TEK
INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404- 0998

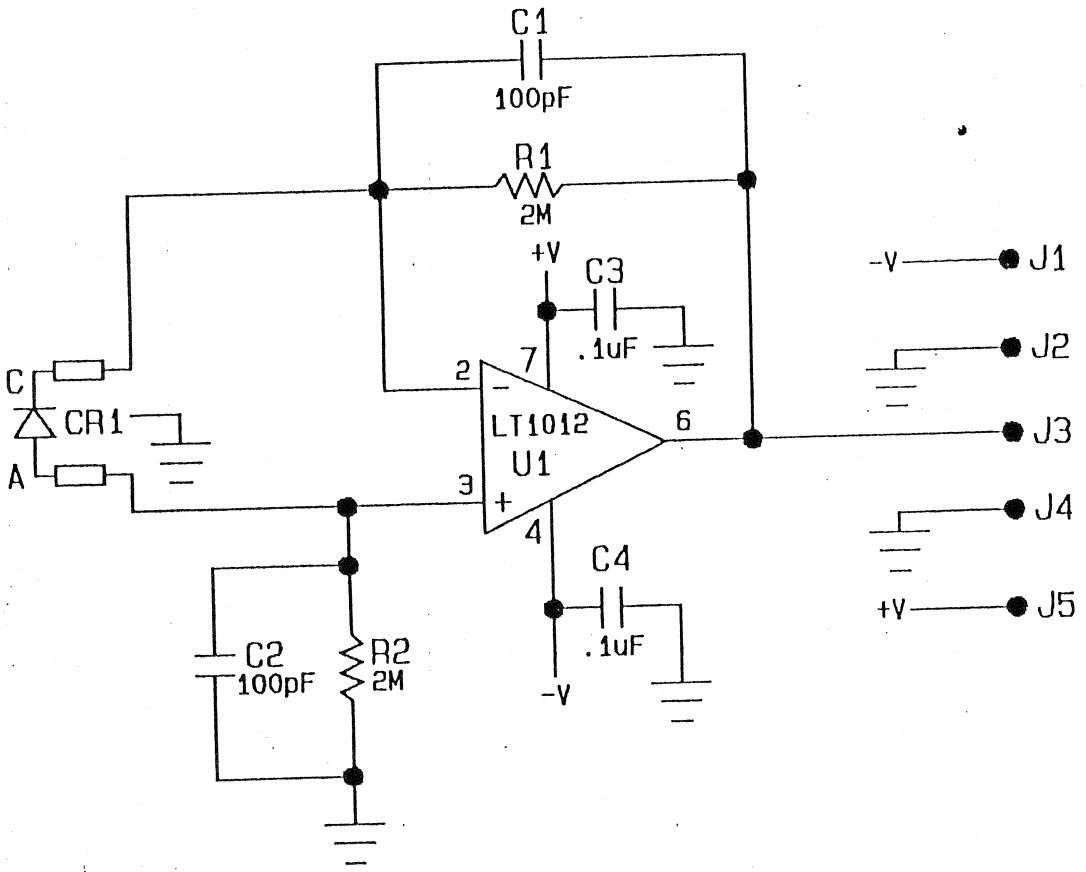
		TITLE	MAIN PCB (LESS FRONT END)
APPROVALS	DATE		
DRAWN GFW	07/94	SCALE	DRAWING#
CHECKED		SHEET 8OF 8	7330410-SC



NOV 1996

BIO-TEK
INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404- 0998

					APPROVALS	DATE	TITLE MOVING INTCON PCB	
A	RELEASE TO PRODUCTION	25462	9/13/94	SAW	DRAWN SAW	08/94	SCALE	DRAWING#
REV	DESCRIPTION	ECO	DATE	BY	CHECKED		SHEET 1 OF 1	7330401-SC



NOV 1996

BY

APPROVED

BIO-TEK
INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404- 0998

					APPROVALS	DATE
A	RELEASE TO PRODUCTION	26698	9/12/95		DRAWN SAW	8/02/95

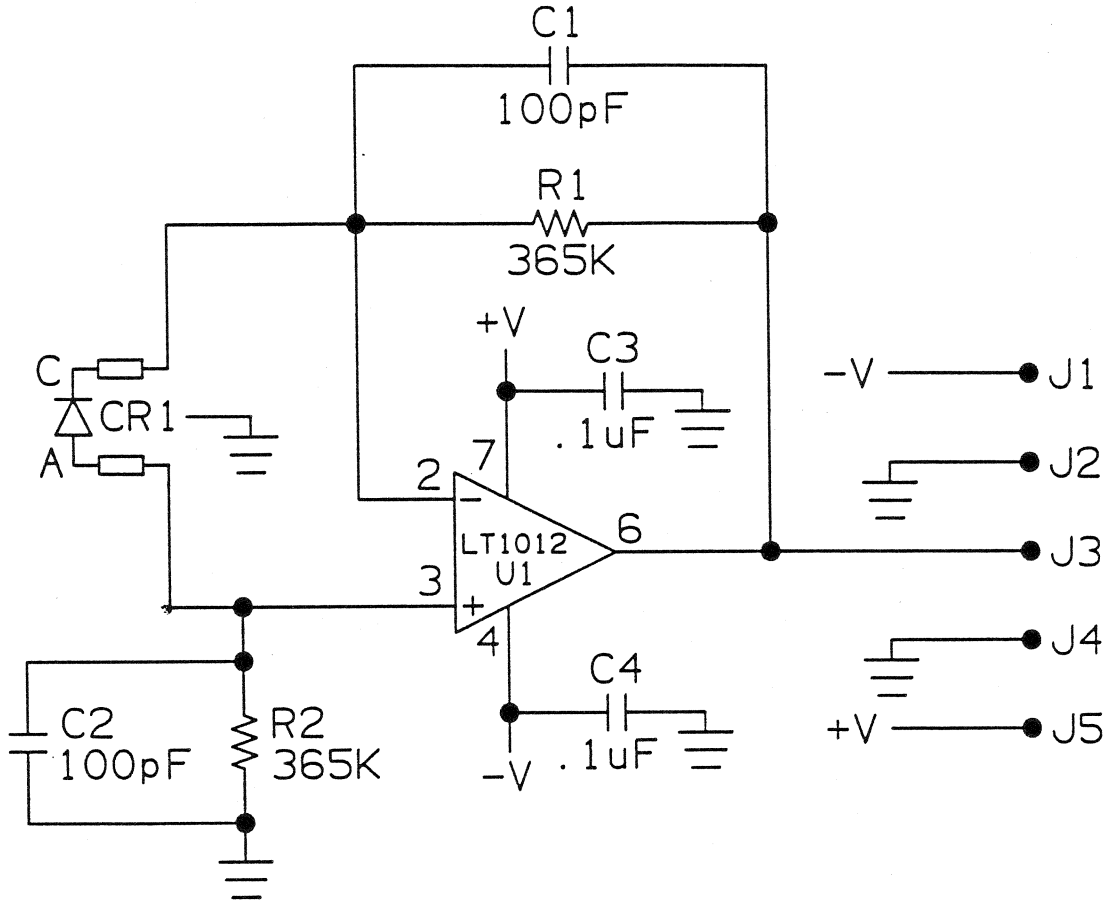
TITLE PCB CURRENT AMPLIFIER ASBY

SCALE

DRAWING# 7330404-SC

SHEET 1 OF 1

REV	DESCRIPTION	ECO	DATE	BY
A	RELEASE TO PRODUCTION	27374	4/2/96	BPS



BIO-TEK® INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404-0998

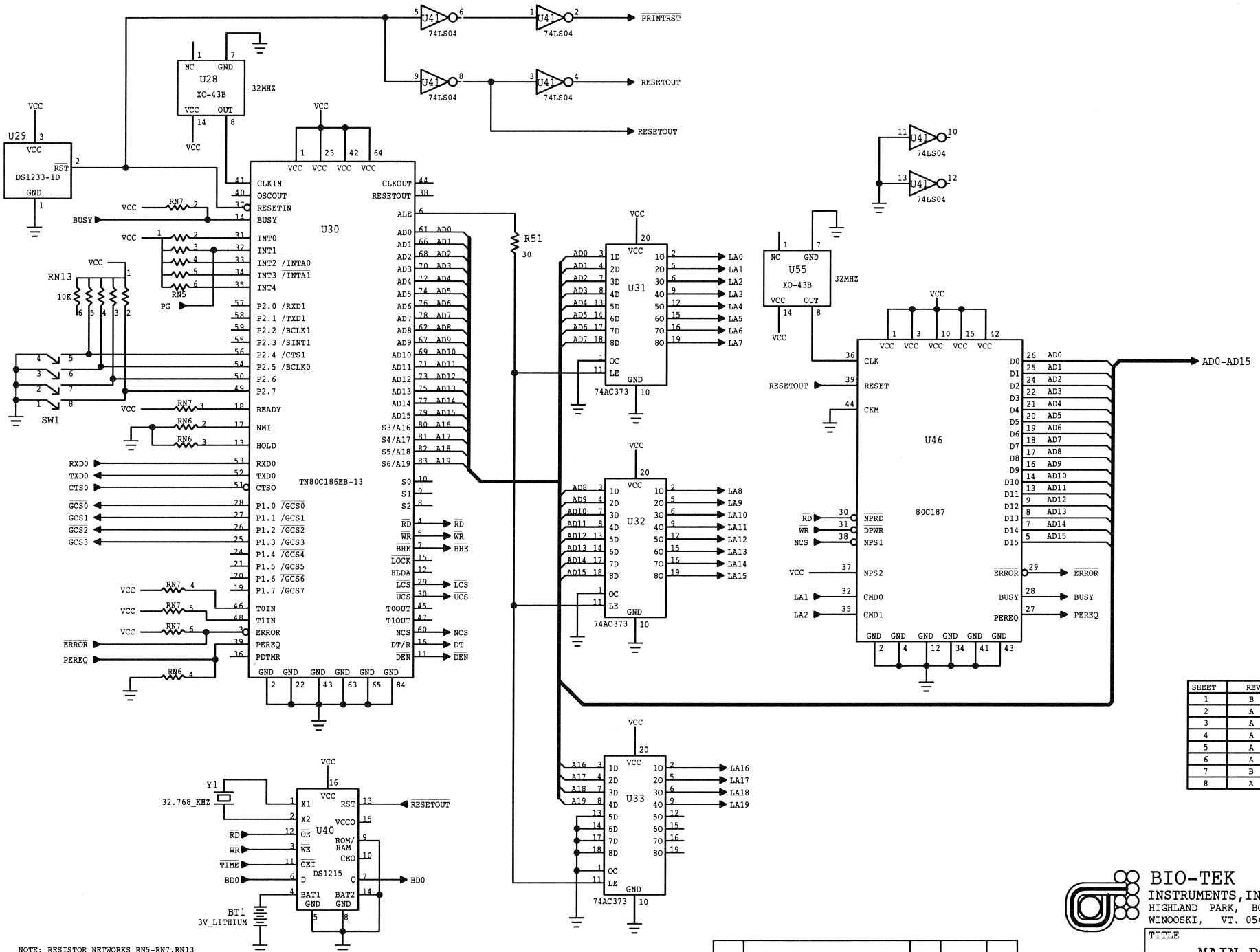
UNLESS OTHERWISE SPECIFIED	SIGNATURES	DATE
ALL DIMENSIONS ARE IN INCHES PRODUCTION TOLERANCES .X±.015 ANGULAR TOL. ±2° .XX±.010 .XXX±.005 SURFACE FINISH 63	DRN BY: SAW	8/2/95
	ENGR	
MATERIAL:	THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION OF BIO-TEK INSTRUMENTS INC. AND NEITHER IT NOR THE INFORMATION CONTAINED THEREIN SHALL BE DISCLOSED TO OTHERS OR DUPLICATED OR USED FOR OTHERS WITHOUT EXPRESS WRITTEN CONSENT OF BIO-TEK INSTRUMENTS INC.	
FINISH:		
DO NOT SCALE / BREAK SHARP EDGES		

TITLE

PCB FRONT END UV CUR AMP ASBY

SIZE	DRAWING NO.	REV
A	7330413-SC	A

SCALE: NONE | SHEET 1 OF 1



NOTE; RESISTOR NETWORKS RN5-RN7,RN13 HAVE A VALUE OF 10K.

SHEET	REV.
1	B
2	A
3	A
4	A
5	A
6	A
7	B
8	A

REV	DESCRIPTION	ECO	DATE	BY
B	Change R4 & R5 value	30227	1/27/98	RMG
A	RELEASE TO PRODUCTION	28520	12/31/96	RMG

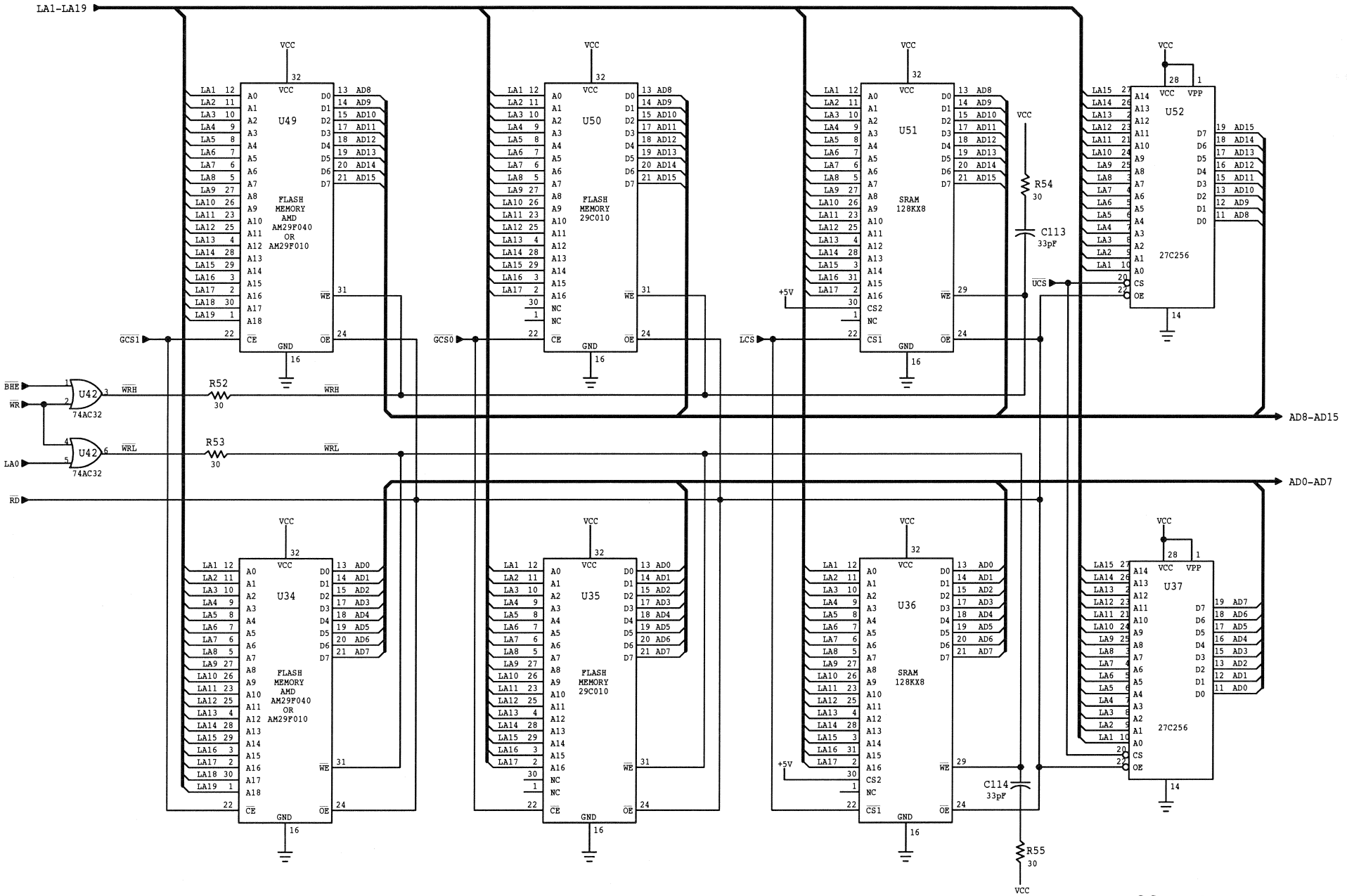
APPROVALS	DATE
DRAWN RMG	12/96
CHECKED	

TITLE: MAIN PCB

SCALE | DRAWING#

SHEET 1OF 8 | 7330415-SC

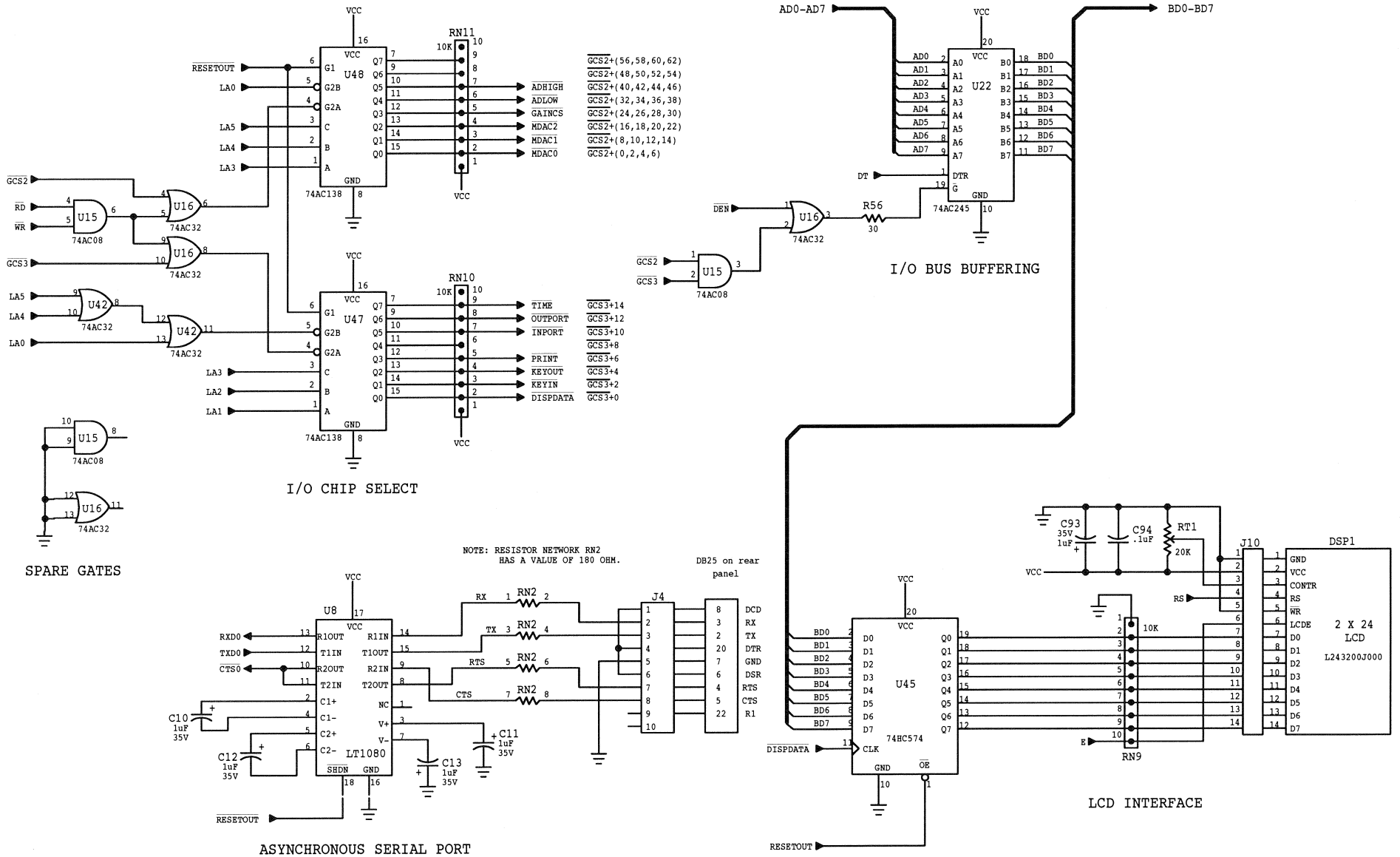
BIO-TEK
INSTRUMENTS,INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404- 0998



REV A

BIO-TEK
INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404- 0998

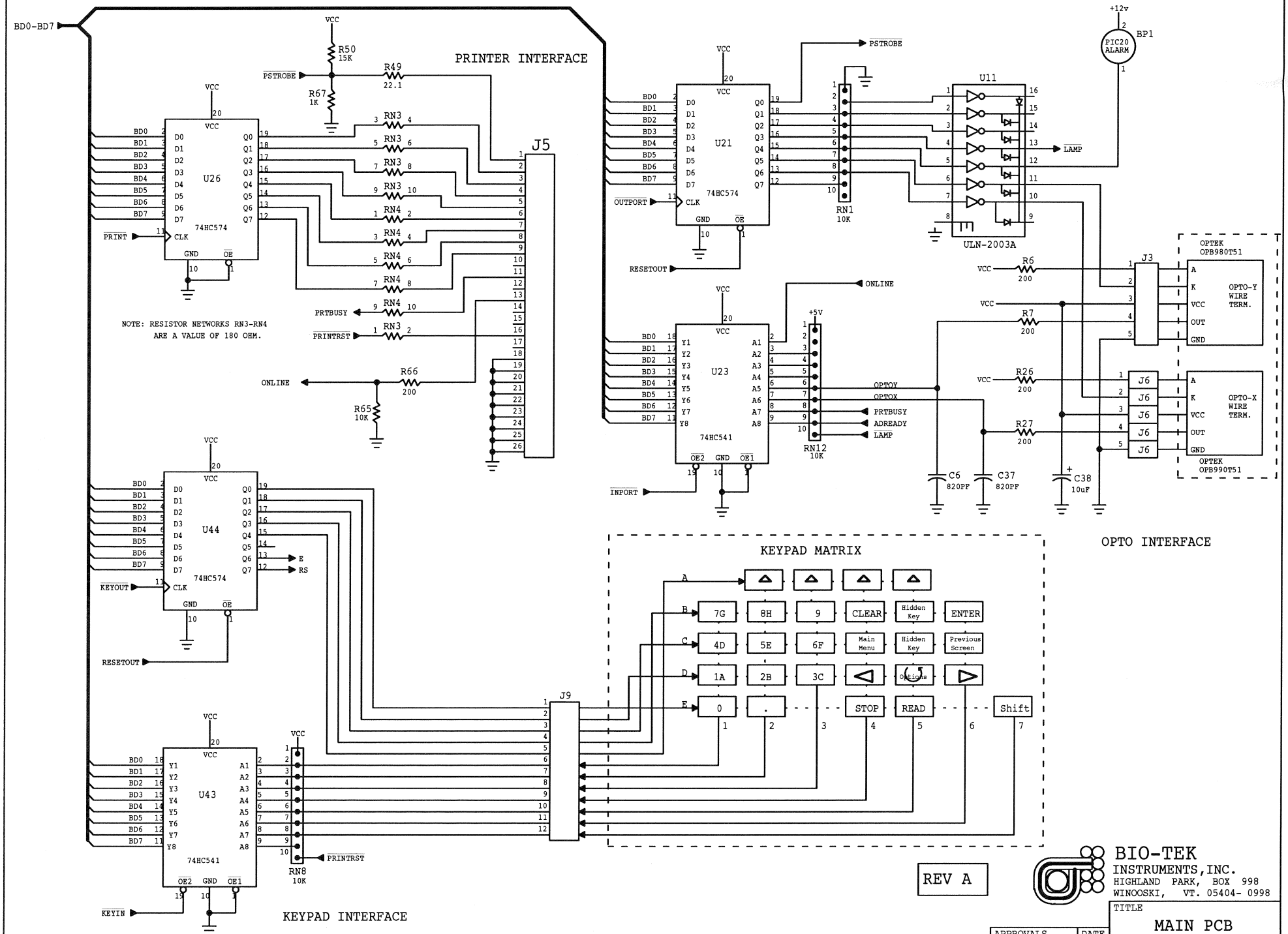
		TITLE	MAIN PCB
APPROVALS	DATE		
DRAWN RMG	12/96	SCALE	DRAWING#
CHECKED		SHEET 2OF 8	7330415-SC

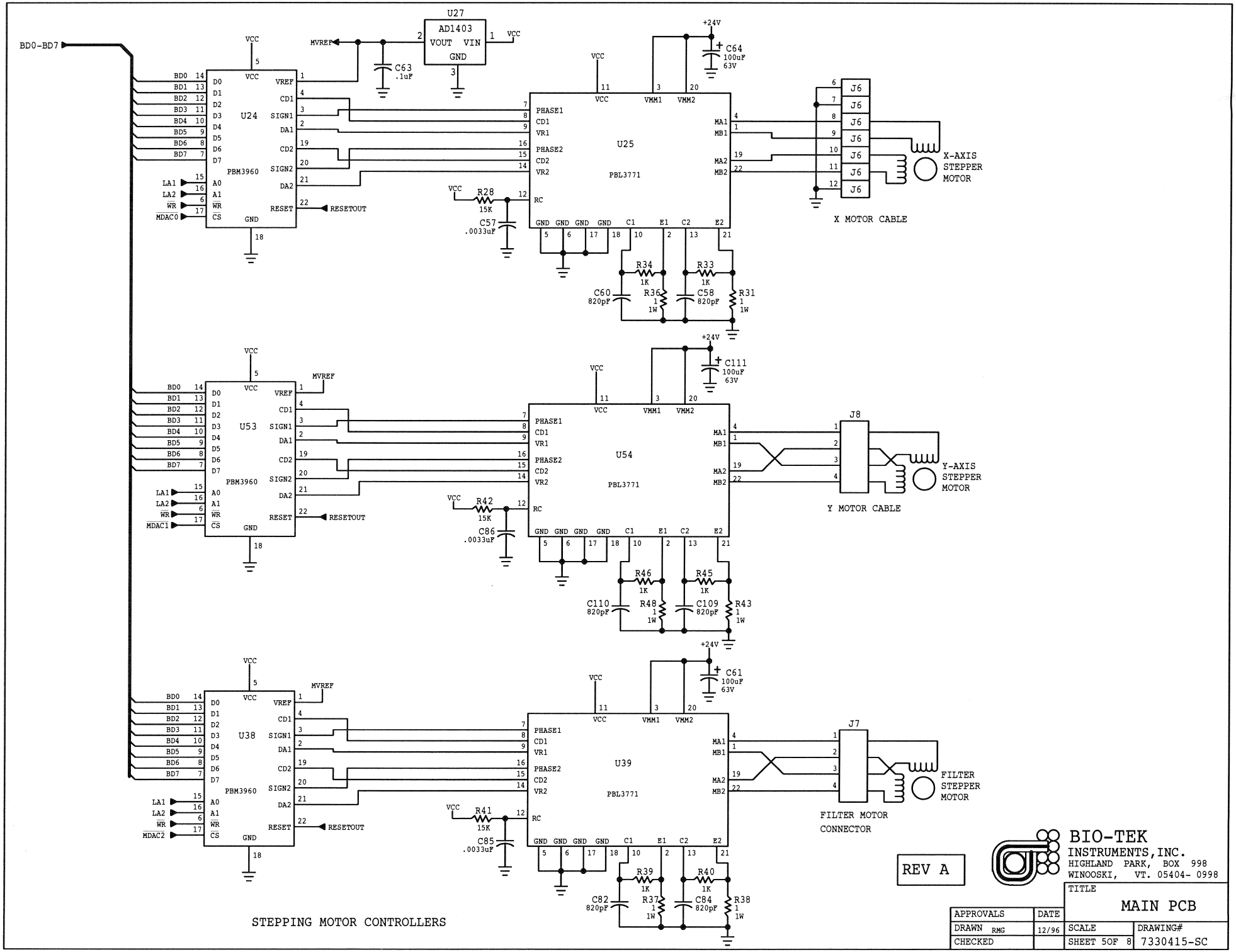


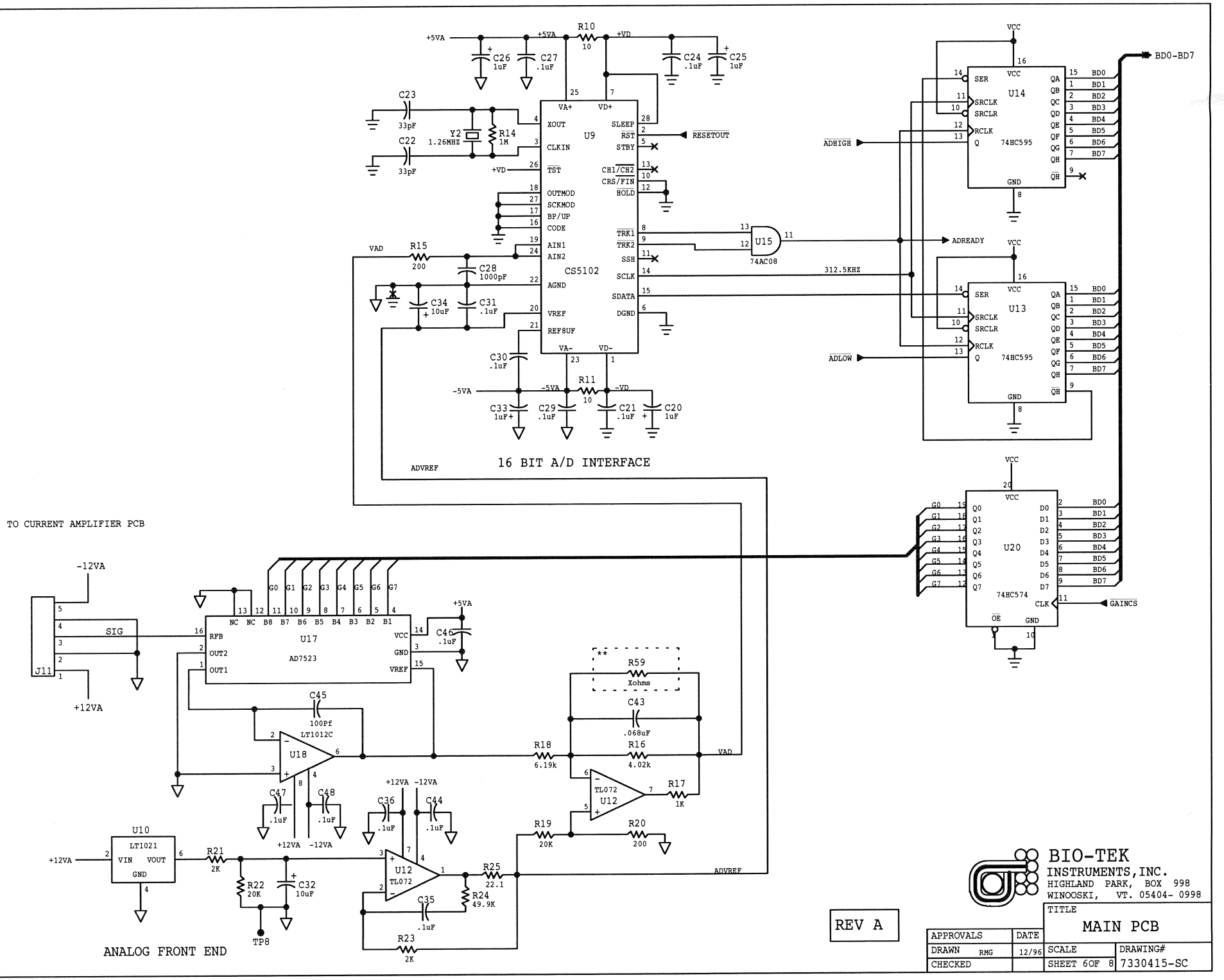
REV A

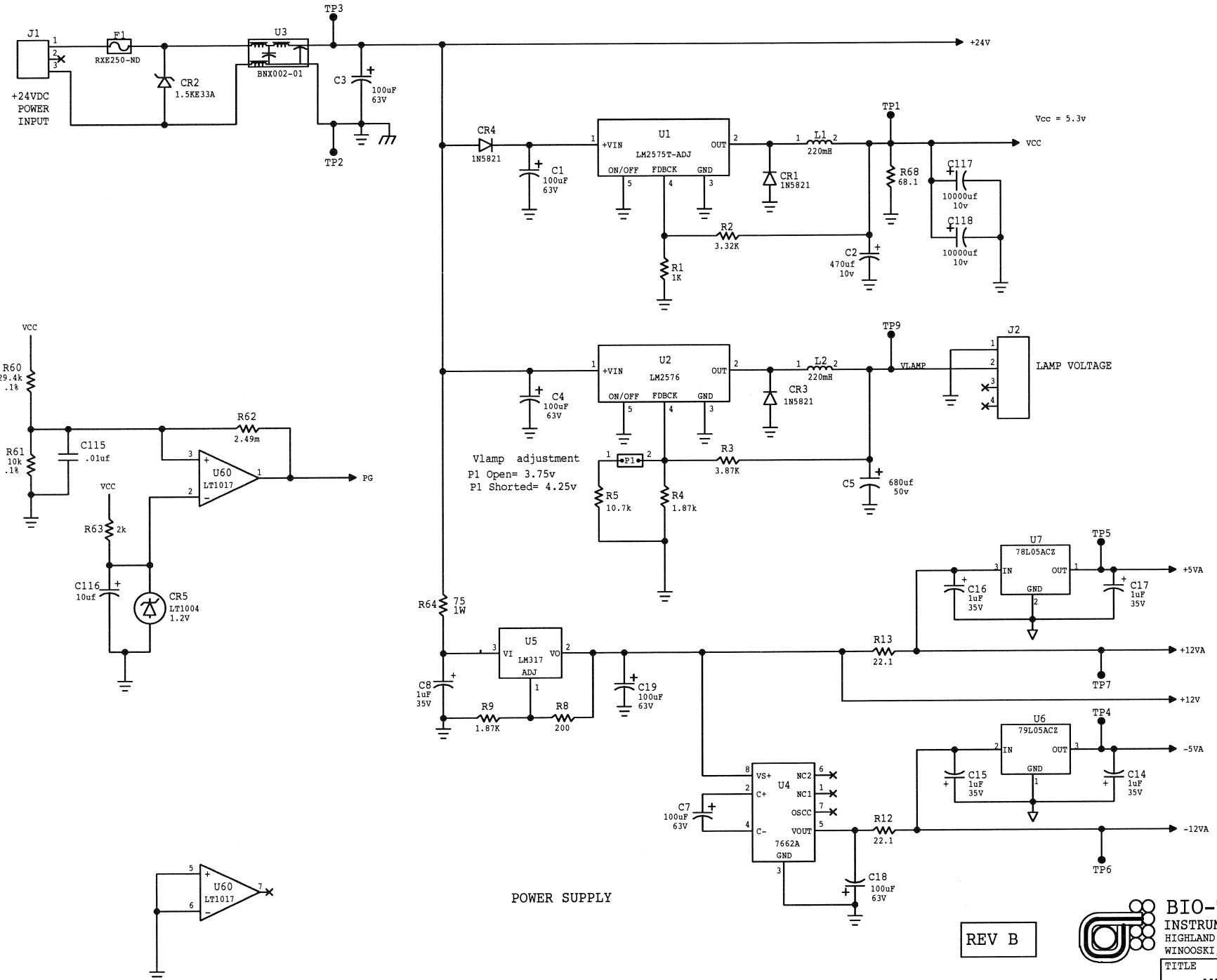
BIO-TEK
INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404- 0998

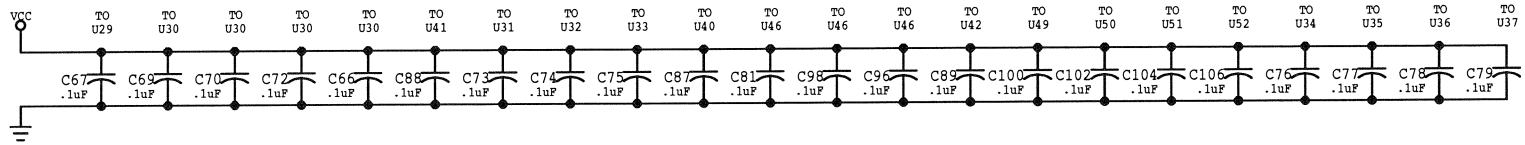
TITLE	MAIN PCB		
APPROVALS	DATE		
DRAWN RMG	12/96	SCALE	DRAWING#
CHECKED		SHEET 3 OF 8	7330415-SC

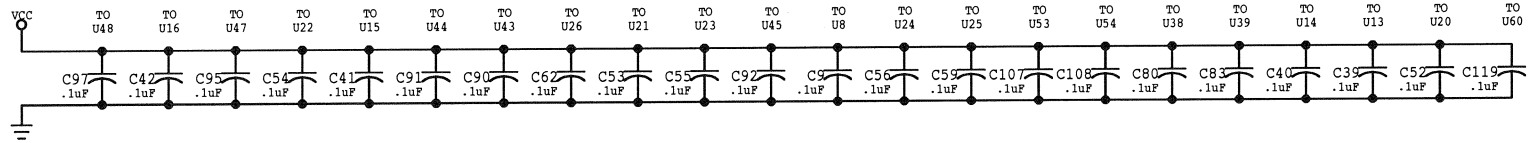

BD0-BD7
PRINTER INTERFACE
VCC
R50
15K
PSTROBE
R49
22.1
R67
1K
U26
74HC574
PRINT
RN3
RN4
J5
NOTE: RESISTOR NETWORKS RN3-RN4
ARE A VALUE OF 180 OHM.
PRTBUSY
PRINTRST
ONLINE
R66
200
R65
10K
U21
OUTPORT
RESETOUT
PSTROBE
U11
ULN-2003A
LAMP
RN1
10K
+12v
PIC20
ALARM
BP1
U23
74HC541
INPORT
ONLINE
+5V
RN12
10K
OPTOY
OPTOX
PRTBUSY
ADREADY
LAMP
R6
R7
R26
R27
200
J3
J6
OPTEK
OPB980T51
OPTO-Y
WIRE
TERM.
OPTEK
OPB990T51
OPTO-X
WIRE
TERM.
C6
820PF
C37
820PF
C38
10uF
OPTO INTERFACE
U44
KEYOUT
RESETOUT
E
RS
KEYPAD MATRIX
A
B
C
D
E
7G
8H
9
CLEAR
Hidden Key
ENTER
4D
5E
6F
Main Menu
Hidden Key
Previous Screen
1A
2B
3C
Options
0
.
STOP
READ
Shift
1
2
3
4
5
6
7
J9
U43
74HC541
KEYIN
RN8
10K
PRINTRST
KEYPAD INTERFACE
REV A
BIO-TEK
INSTRUMENTS,INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404- 0998
TITLE
MAIN PCB
APPROVALS
DATE
DRAWN RMG
12/96
CHECKED
SCALE
SHEET 4 OF 8
DRAWING#
7330415-SC

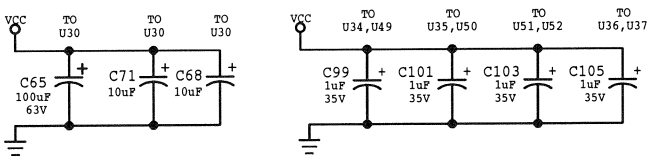

BD0-BD7
U27
AD1403
VOUT VIN
GND
MVREF
C63
.1uF
VCC
+24V
C64
100uF
63V
U24
PBM3960
BD0
BD1
BD2
BD3
BD4
BD5
BD6
BD7
LA1
LA2
WR
MDAC0
VREF
CD1
SIGN1
DA1
CD2
SIGN2
DA2
RESET
RESETOUT
GND
U25
PBL3771
PHASE1
CD1
VR1
PHASE2
CD2
VR2
RC
VMM1
VMM2
MA1
MB1
MA2
MB2
C1
E1
C2
E2
R28
15K
C57
.0033uF
R34
1K
R33
1K
C60
820pF
R36
1
1W
C58
820pF
R31
1
1W
J6
X-AXIS
STEPPER
MOTOR
X MOTOR CABLE
U53
C111
100uF
63V
U54
R42
15K
C86
.0033uF
R46
1K
R45
1K
C110
820pF
R48
1
1W
C109
820pF
R43
1
1W
J8
Y-AXIS
STEPPER
MOTOR
Y MOTOR CABLE
U38
C61
100uF
63V
U39
R41
15K
C85
.0033uF
R39
1K
R40
1K
C82
820pF
R37
1
1W
C84
820pF
R38
1
1W
J7
FILTER
STEPPER
MOTOR
FILTER MOTOR
CONNECTOR
STEPPING MOTOR CONTROLLERS
REV A
BIO-TEK
INSTRUMENTS,INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404- 0998
TITLE
MAIN PCB
APPROVALS
DRAWN RMG
CHECKED
DATE
12/96
SCALE
SHEET 5OF 8
DRAWING#
7330415-SC


16 BIT A/D INTERFACE
TO CURRENT AMPLIFIER PCB
ANALOG FRONT END
U9
CS5102
U13
U14
U15
74AC08
74HC595
U20
74HC574
U17
AD7523
U18
LT1012C
U12
TL072
U10
LT1021
J11
SIG
TP8
BD0-BD7
ADHIGH
ADLOW
ADREADY
312.5KHZ
RESETOUT
GAINCS
ADVREF
VAD
+5VA
-5VA
+12VA
-12VA
+VD
-VD
R10
R11
R14
R15
R16
R17
R18
R19
R20
R21
R22
R23
R24
R25
R59
Xohms
C22
C23
C24
C25
C26
C27
C28
C29
C30
C31
C32
C33
C34
C35
C36
C43
C44
C45
C46
C47
C48
Y2
1.26MHZ
BIO-TEK
INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404- 0998
REV A
TITLE
MAIN PCB
APPROVALS
DATE
DRAWN RMG
12/96
CHECKED
SCALE
SHEET 6OF 8
DRAWING#
7330415-SC


J1
F1
RXE250-ND
U3
BNX002-01
TP3
TP2
+24V
+24VDC
POWER
INPUT
CR2
1.5KE33A
C3
100uF
63V
CR4
1N5821
C1
100uF
63V
U1
+VIN
OUT
LM2575T-ADJ
ON/OFF
FDBCK
GND
L1
220mH
TP1
Vcc = 5.3v
VCC
CR1
1N5821
R68
68.1
C117
10000uf
10v
C118
10000uf
10v
R2
3.32K
R1
1K
C2
470uf
10v
TP9
J2
U2
LM2576
L2
220mH
VLAMP
LAMP VOLTAGE
C4
100uF
63V
CR3
1N5821
Vlamp adjustment
P1 Open= 3.75v
P1 Shorted= 4.25v
P1
R3
3.87K
R5
10.7k
R4
1.87k
C5
680uf
50v
VCC
R60
29.4k
.1%
R61
10k
.1%
C115
.01uf
R62
2.49m
U60
LT1017
PG
R63
2k
C116
10uf
CR5
LT1004
1.2V
R64
75
1W
U5
LM317
ADJ
VI
VO
C8
1uF
35V
R9
1.87K
R8
200
C19
100uF
63V
U7
78L05ACZ
IN
OUT
GND
TP5
+5VA
C16
1uF
35V
C17
1uF
35V
R13
22.1
+12VA
TP7
+12V
U6
79L05ACZ
TP4
-5VA
C15
1uF
35V
C14
1uF
35V
U4
VS+
C+
C-
NC2
NC1
OSCC
VOUT
7662A
GND
C7
100uF
63V
R12
22.1
-12VA
TP6
C18
100uF
63V
U60
LT1017
POWER SUPPLY
REV B
BIO-TEK
INSTRUMENTS,INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404- 0998
TITLE
MAIN PCB
APPROVALS
DATE
DRAWN RMG
12/96
CHECKED
SCALE
SHEET 7OF 8
DRAWING#
7330415-SC







BYPASS CAPACITORS

REV A

BIO-TEK
INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404- 0998

		TITLE	MAIN PCB
APPROVALS	DATE		
DRAWN RMG	12/96	SCALE	DRAWING#
CHECKED		SHEET 8OF 8	7330415-SC

Bill of Materials

The following are the bills of material used in building the *ELx800* and its variations. These documents are also subject to change.

ELX800	X-Y Reader
*ELX800*NB	X-Y Reader Narrow Beam
*ELX800*UV	X-Y Reader UV
*ELX800*G	X-Y Reader Generic
7330002	Shipping accessories
7330005	Final assembly
7330006	Final Assembly UV
7330007	Final Assembly Narrow Beam
7330008	Final Assembly Generic XY
7330009	Kit,services,ELx800
7330410	Main PCB assembly (obsolete)
7330401	Moving interconnect PCB assembly
7330413	Front end UV/NB current amp assembly
7330414	Front end current amp assembly
7330415	Main PCB assembly
7330500	Generic final kit
7330501	Cable lamp asby
7330502	Cable motor Y axis asby
7330503	Cable power input asby
7330504	Cable lamp extension asby
7330506	Cable opto 14L asby
7330507	Cable X axis motor
7330508	Mech pre assembled asby
7330509	Cable Lamp UV assembly (this is the replacement part # for UV and NB units)
7330513	Bulb with wrench replacement asby(this is the replacement part # for non UV or NB units)
7330515	Carrier asby
7330522	Optics arm asby
7330523	Optics arm UV asby
7330524	Optics arm narrow beam asby
8050509	Cable filter wheel motor asby

BILL OF MATERIALS REPORT

SHIPPING ACCESSORY LISTS
PART: ELX800
DESC: X Y READER REV: Y
AS OF: 6/13/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
16016	6.00	LKWSHR #8 HELICAL SPR SS	A	
17054	6.00	WSHR FL .188IDX.438ODX.049 SS	C	
19017	6.00	SCR SOCK CAP 8-32X3/8 BLK	A	
19159	4.00	SCR PLASTIC HEAD 6-32X.31	A	
2872086	1.00	DUMMY FILTER	B	IN POSITION 5
2874405	1.00	FILTER ASBY 405NM READER	D	IN POSITION 1
2874450	1.00	FILTER ASBY 450NM READER	C	IN POSITION 2
2874490	1.00	490NM READER FILTER ASBY	C	IN POSITION 3
2874630	1.00	FILTER ASBY 630NM READER	C	IN POSITION 4
3070186	0.00	SOFTWARE KCJR PC-DOS,V1.14	G	TOOL ONLY
49748	1.00	FSTNR 8-32X3/8 BLACK SLOT	A	
7330002	1.00	SHIPPING ACCESSORIES	D	
7330005	1.00	FINAL ASBY	AF	
7330005-TP	0.00	-FINAL ASBY	O	DOCUMENT ONLY
7330202	0.00	FRMWR DOWNLOADED CODE V2.83	N	TOOL ONLY
7330202-SP	0.00	-FRMWR DOWNLOADED CODE V2.83	N	TOOL ONLY
7330203	0.00	FRMWR DWNLD ASAY CONFIG V2.80	G	TOOL ONLY
7330203-SP	0.00	-FRMWR DWNLD ASSY CONFIGV2.80	G	TOOL ONLY
7331015	1.00	DECLARATION OF CONFORMITY	B	
7331024	1.00	OVRLY 800 FRONT	B	
7332000	1.00	WHEEL FILTER	B	
7332022	1.00	COVER FILTER WHEEL	B	
7771010	1.00	LABEL ETL UL CSA 1010.1 LISTED	B	INSTALLED BY CERTIFIED TECH
7771012	1.00	TAG S/N WITH CE MARK	A	INSTALLED BY CERTIFIED TECH
8290202	0.00	SFTWR INSTL DEF RDR PRO V1.32	K	TOOL ONLY

BILL OF MATERIALS REPORT

SHIPPING ACCESSORY LISTS
PART: ELX800NB
DESC: X Y READER NARROW BEAM REV: X
AS OF: 6/13/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
16016	6.00	LKWSHR #8 HELICAL SPR SS	A	
17054	6.00	WSHR FL .188IDX.438ODX.049 SS	C	
19017	6.00	SCR SOCK CAP 8-32X3/8 BLK	A	
19159	4.00	SCR PLASTIC HEAD 6-32X.31	A	
2872086	1.00	DUMMY FILTER	B	IN POSITION 5
2874405	1.00	FILTER ASBY 405NM READER	D	IN POSITION 1
2874450	1.00	FILTER ASBY 450NM READER	C	IN POSITION 2
2874490	1.00	490NM READER FILTER ASBY	C	IN POSITION 3
2874630	1.00	FILTER ASBY 630NM READER	C	IN POSITION 4
3070186	0.00	SOFTWARE KCJR PC-DOS,V1.14	G	TOOL ONLY
49748	4.00	FSTNR 8-32X3/8 BLACK SLOT	A	
7330002	1.00	SHIPPING ACCESSORIES	D	
7330005-TP	0.00	-FINAL ASBY	O	DOCUMENT ONLY
7330007	1.00	FINAL ASBY NARROW BEAM	X	
7330202	0.00	FRMWR DOWNLOADED CODE V2.83	N	TOOL ONLY
7330202-SP	0.00	-FRMWR DOWNLOADED CODE V2.83	N	TOOL ONLY
7330209	0.00	FRMWR CONFIG ELX800NB V2.80	F	TOOL ONLY
7330209-SP	0.00	-FRMWR CONFIG ELX800NB V2.80	F	TOOL ONLY
7331015	1.00	DECLARATION OF CONFORMITY	B	
7331026	1.00	OVRLY 800NB FRONT	B	
7332000	1.00	WHEEL FILTER	B	
7332022	1.00	COVER FILTER WHEEL	B	
7350005	1.00	EXCEL/RDR DATA LG ASBY	C	PUT IN BOX W/READER
7771010	1.00	LABEL ETL UL CSA 1010.1 LISTED	B	INSTALLED BY CERTIFIED TECH
7771012	1.00	TAG S/N WITH CE MARK	A	INSTALLED BY CERTIFIED TECH
8290202	0.00	SFTWR INSTL DEF RDR PRO V1.32	K	TOOL ONLY

BILL OF MATERIALS REPORT

SHIPPING ACCESSORY LISTS
PART: ELX800UV
DESC: X Y READER UV REV: X
AS OF: 6/13/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
16016	6.00	LKWSHR #8 HELICAL SPR SS	A	
17054	6.00	WSHR FL .188IDX.438ODX.049 SS	C	
19017	6.00	SCR SOCK CAP 8-32X3/8 BLK	A	
19159	4.00	SCR PLASTIC HEAD 6-32X.31	A	
2874340	1.00	FILTER ASBY 340NM READER	B	IN POSITION 5
2874405	1.00	FILTER ASBY 405NM READER	D	IN POSITION 1
2874450	1.00	FILTER ASBY 450NM READER	C	IN POSITION 2
2874490	1.00	490NM READER FILTER ASBY	C	IN POSITION 3
2874630	1.00	FILTER ASBY 630NM READER	C	IN POSITION 4
3070186	0.00	SOFTWARE KCJR PC-DOS,V1.14	G	TOOL ONLY
49748	4.00	FSTNR 8-32X3/8 BLACK SLOT	A	
7330002	1.00	SHIPPING ACCESSORIES	D	
7330005-TP	0.00	-FINAL ASBY	O	DOCUMENT ONLY
7330006	1.00	FINAL ASBY UV	X	
7330007	1.00	FINAL ASBY NARROW BEAM	X	
7330202	0.00	FRMWR DOWNLOADED CODE V2.83	N	TOOL ONLY
7330202-SP	0.00	-FRMWR DOWNLOADED CODE V2.83	N	TOOL ONLY
7330208	0.00	FRMWR CONFIG ELX800UV V2.80	F	TOOL ONLY
7330208-SP	0.00	-FRMWR CONFIG ELX800UV V2.80	F	TOOL ONLY
7331015	1.00	DECLARATION OF CONFORMITY	B	
7331027	1.00	OVRLY 800UV FRONT	B	
7332000	1.00	WHEEL FILTER	B	
7332022	1.00	COVER FILTER WHEEL	B	
7771010	1.00	LABEL ETL UL CSA 1010.1 LISTED	B	INSTALLED BY CERTIFIED TECH
7771012	1.00	TAG S/N WITH CE MARK	A	INSTALLED BY CERTIFIED TECH
8290202	0.00	SFTWR INSTL DEF RDR PRO V1.32	K	TOOL ONLY

BILL OF MATERIALS REPORT

SHIPPING ACCESSORY LISTS
PART: ELX800G
DESC: X Y READER GENERIC REV:
AS OF: 6/13/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
16016	6.00	LKWSHR #8 HELICAL SPR SS	A	
17054	6.00	WSHR FL .188IDX.438ODX.049 SS	C	
19017	6.00	SCR SOCK CAP 8-32X3/8 BLK	A	
19159	4.00	SCR PLASTIC HEAD 6-32X.31	A	
2872086	1.00	DUMMY FILTER	B	IN POSITION 5
2874405	1.00	FILTER ASBY 405NM READER	D	IN POSITION 1
2874450	1.00	FILTER ASBY 450NM READER	C	IN POSITION 2
2874490	1.00	490NM READER FILTER ASBY	C	IN POSITION 3
2874630	1.00	FILTER ASBY 630NM READER	C	IN POSITION 4
3070186	0.00	SOFTWARE KCJR PC-DOS,V1.14	G	TOOL ONLY
49748	1.00	FSTNR 8-32X3/8 BLACK SLOT	A	
7330002	1.00	SHIPPING ACCESSORIES	D	
7330005	1.00	FINAL ASBY	AF	
7330008	1.00	FINAL ASBY GENERIC XY	Y	
7330005-TP	0.00	-FINAL ASBY	O	DOCUMENT ONLY
7330202	0.00	FRMWR DOWNLOADED CODE V2.83	N	TOOL ONLY
7330202-SP	0.00	-FRMWR DOWNLOADED CODE V2.83	N	TOOL ONLY
7330211	0.00	FRMWR CONFIG ELX800G V2.01	E	TOOL ONLY
7330211-SP	0.00	-FRMWR CONFIG ELX800G V2.01	E	TOOL ONLY
7331015	1.00	DECLARATION OF CONFORMITY	B	
7332000	1.00	WHEEL FILTER	B	
7332022	1.00	COVER FILTER WHEEL	B	
7771010	1.00	LABEL ETL UL CSA 1010.1 LISTED	B	INSTALLED BY CERTIFIED TECH
7771012	1.00	TAG S/N WITH CE MARK	A	INSTALLED BY CERTIFIED TECH
8290202	0.00	SFTWR INSTL DEF RDR PRO V1.32	K	TOOL ONLY
99125	1.00	LABEL 1"X1/2" CONTINOUS	B	MARK WITH MODEL NUMBER

BILL OF MATERIALS REPORT

SHIPPING ACCESSORY LISTS
PART: 7330002
DESC: SHIPPING ACCESSORIES REV: D
AS OF: 6/13/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
19337	2.00	SEMS 6-32X1 1/4 ST PHIL ITOOTH	A	FOR SHIPPING BLOCK
48255	0.01 FT	TAPE LAB 1" WIDE YELLOW	A	
49746	1.00	CORD SHOCK W/HOOKS 18L	B	
61062	1.00	PWR SUPPLY 24VDC DESKTOP	E	
71072	1.00	CABLE,FOR PRINTER, IBMPC 6FT	A	IN BOX WITH UNIT
7331000	1.00	OPERATOR'S MANUAL ELX800	G	
7331006	1.00	LABEL UNPACKING INSTRUCTIONS	A	
7332040	1.00	COVER DUST	A	IN BOX WITH UNIT
7332041	1.00	BLOCK SHIPPING SHAFT RETAIN	A	
7332062	1.00	SHIPPING BOX END CAPS SHELF	A	
91016	0.01 FT	TAPE REINF GUMMED 3" BRN	A	
91083	1.00	BUBBLE BAG 8X11.5	A	FOR POWER SUPPLY
94075	1.00	SHIPPING DOCUMENT KIT	F	INSERTED BY SHIPPING
98085	1.00	BAG POLY 26X32 2 MIL	A	FOR UNIT
98145	1.00	SCREWDRIVER COMB PHIL/SLOT	A	
99204	1.00	RUBBER BAND 7 X 1/8 X 1/16	A	

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHEDGOODS
PART: 7330005
DESC: FINAL ASBY REV:AF
AS OF: 6/15/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
7330005-AS	0.00	-FINAL ASBY	AB	DOCUMENT ONLY
7330005-DS	0.00	-FINAL ASBY DATA SHEET	I	DOCUMENT ONLY
7330414	1.00	PCB FRONT END CURRENT AMP ASBY	F	
7330415	1.00	MAIN PCB ASBY	E	
7330500	1.00	GENERIC FINAL KIT	T	
7330508	1.00	MECH PRE ASSEMBLED ASBY	M	
7330528	1.00	CABLE CURRENT AMPLIFIER	A	CABLE I
7331023	1.00	OVRLY KEYBOARD READER	B	
7332009	1.00	COVER TOP	I	
7332030	1.00	PLATE BASE PAINTED	I	
7770102	1.00	LABEL "FCC COMPLIANCE"	A	
9001018	1.00	LABEL IN-VITRO DIAG USE	A	

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS
PART: 7330006
DESC: FINAL ASBY UV REV: X
AS OF: 6/15/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
42151	1.00	JUMPER .100 .025 SQ PINS	C	ON P1
7330005-AS	0.00	-FINAL ASBY	AB	DOCUMENT ONLY
7330005-DS	0.00	-FINAL ASBY DATA SHEET	I	DOCUMENT ONLY
7330413	1.00	PCB FRONT END UV CUR AMP ASBY	F	
7330415	1.00	MAIN PCB ASBY	E	
7330500	1.00	GENERIC FINAL KIT	T	
7330518	1.00	MECH PRE ASSEMBLED UV ASBY	G	
7330528	1.00	CABLE CURRENT AMPLIFIER	A	CABLE I
7331023	1.00	OVRLY KEYBOARD READER	B	
7332009	1.00	COVER TOP	I	
7332030	1.00	PLATE BASE PAINTED	I	
7770102	1.00	LABEL "FCC COMPLIANCE"	A	
9001018	1.00	LABEL IN-VITRO DIAG USE	A	

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS
PART: 7330007
DESC: FINAL ASBY NARROW BEAM REV: X
AS OF: 6/15/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
42151	1.00	JUMPER .100 .025 SQ PINS	C	ON P1
7330005-AS	0.00	-FINAL ASBY	AB	DOCUMENT ONLY
7330005-DS	0.00	-FINAL ASBY DATA SHEET	I	DOCUMENT ONLY
7330414	1.00	FRONT END CURRENT AMP ASBY	F	
7330415	1.00	MAIN PCB ASBY	E	
7330500	1.00	GENERIC FINAL KIT	T	
7330517	1.00	MECH PRE ASSEMBLED NB ASBY	H	
7330528	1.00	CABLE CURRENT AMPLIFIER	A	CABLE I
7331023	1.00	OVRLY KEYBOARD READER	B	
7332009	1.00	COVER TOP	I	
7332030	1.00	PLATE BASE PAINTED	I	
7332048	1.00	SPACER OPTIC ARM MOUNTING	A	
7770102	1.00	LABEL "FCC COMPLIANCE"	A	
9001018	1.00	LABEL IN-VITRO DIAG USE	A	

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS
PART: 7330008
DESC: FINAL ASBY GENERIC XY REV: Y
AS OF: 6/16/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
7330005-AS	0.00	-FINAL ASBY	AB	DOCUMENT ONLY
7330005-DS	0.00	-FINAL ASBY DATA SHEET	I	DOCUMENT ONLY
7330414	1.00	FRONT END CURRENT AMP ASBY	F	
7330500	1.00	GENERIC FINAL KIT	T	
7330508	1.00	MECH PRE ASSEMBLED ASBY	M	
7331010	1.00	OVRLY KEYBOARD GENERIC	E	
7332030	1.00	PLATE BASE PAINTED	I	
7332050	1.00	COVER TOP GENERIC	B	
7770102	1.00	LABEL "FCC COMPLIANCE"	A	
9001018	1.00	LABEL IN-VITRO DIAG USE	A	
7330528	1.00	CABLE CURRENT AMPLIFIER	A	CABLE I
7330415	1.00	MAIN PCB ASBY	E	

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS
PART: 7330009
DESC: KIT, SERVICE, ELX800 REV: L
AS OF: 6/16/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
04018	1.00	LCD 2X24 SUPERTWIST DISPLAY	C	
3122023	1.00	MOTOR,STPR 1.8DEG,FLAT SHAFT	G	
3402000	2.00	LENS, BICONVEX BK7	C	
3740008	1.00	BOX, 18.50 X 17.75 X 12.625	A	
41038	1.00	BELT TIMING 320T 3/16W D	C	
41039	1.00	BELT TIMING 340T 3/16W B	B	
54013	2.00	SWITCH SPST ROCKER PANEL MNT	B	
61062	1.00	PWR SUPPLY 24VDC DESKTOP	E	
68019	1.00	MOTOR STEPER SIZE 17 SGL SFT	D	
68020	1.00	FILTER WHEEL MOTOR	A	
71154	1.00	FLEX CIRCUIT 12 COND 8.00" SR	A	
7330014	1.00	KIT SVCE PHOTODIODE REPLACMENT	C	
7330015	1.00	KIT SVCE DAUGHTER MOD REPLMT	B	
7330202	0.00	FRMWR DOWNLOADED CODE V2.83	N	
7330203	0.00	FRMWR DWNLD ASSAY CONFIG V2.80	G	
7330208	0.00	FRMWR CONFIG ELX800UV V2.80	F	
7330209	0.00	FRMWR CONFIG ELX800NB V2.80	F	
7330211	0.00	FRMWR CONFIG ELX800G V2.01	E	
7330415	1.00	MAIN PCB ASBY	E	
7330401	1.00	MOVING INTCON PCB ASBY	A	
7330501S	2.00	SVCE CABLE LAMP ASBY	C	
7330516	2.00	BULB UV/NB REPLACE ASBY	A	
7330528	1.00	CABLE CURRENT AMPLIFIER	A	CABLE I
7331005	1.00	SERVICE MANUAL	B	
7331023	1.00	OVRLY KEYBOARD READER	B	
7332008	1.00	SPRING MICROPLATE RETAINING	C	
7332009	1.00	COVER TOP	I	
7332013	1.00	CARRIER MICROPLATE	F	
7332032	1.00	LENS OPTICAL	A	
7332033	1.00	MIRROR OPTICAL	B	
7332500	1.00	JIG FILTER WHEEL MOTOR SPACER	A	
7332508	1.00	JIG AUTOCAL	E	
8290006	1.00	KIT FIELD SOFTWARE UPGRADE	D	

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS
PART: 7330401
DESC: MOVING INTCON PCB ASBY REV: A
AS OF: 6/16/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
7330401-AS	0.00	-MOVING INTCON PCB ASBY	A	DOCUMENT ONLY
7330401-SC	0.00	-MOVING INTCON PCB ASBY SCHEM	A	DOCUMENT ONLY
7331401	1.00	MOVING INTCON PCB	A	
28076	1.00	OPTICAL SENSOR PCB MT	A	U1
42332	1.00	HEDR 4-P .100 RTANG POLARIZED	B	J2
42552	1.00	CONN 12P .049 RT STR RLF	A	J1

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS
PART: 7330410
DESC: OBSOLETE SEE 7330415 REV: J
AS OF: 6/16/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
21010	3.00	DIODE IN5821 SCHOTTKY 30V 1/4W	B	CR1,3,4
23013	1.00	OP AMP LT1012CN8 SINGLE	B	U18
23021	1.00	VOLT REG +ADJ 1.5A 317	C	U5
23026	1.00	VOLT REG +5V 78L05A	A	U7
23029	1.00	VOLT REG -5V 79L05	A	U6
23072	1.00	VOLT REG LM2575T	C	U1
23092	1.00	VOLT REG ADJ LM2576 SWITCHER	A	U2
25027	2.00	IC 74HC595 SHIFT REG 8BIT 3ST	B	U13,14
25051	1.00	IC 74LS04 HEX INVERTER	D	U41
25084	2.00	IC 74HC541 TS OCTAL BFR NONINV	E	U23,43
25086	5.00	IC 74HC574 OCTAL D FLIP-FLOP	C	U20,21,26,44,45
25094	1.00	IC L7662CPA NEG CONVERTER	B	U4
25106	1.00	IC 74AC245 OCTAL TRANSCEIVER	F	U22
25107	2.00	IC 74AC32 QUAD 2-INPUT OR GATE	E	U16,42
25108	1.00	IC LT1017CN8 COMPARATOR	A	U60
25114	1.00	IC LT1080 RS232 DRU/RECEIVER	A	U8
25130	3.00	IC 74AC373 OCTAL LATCH	A	U31-33
25131	1.00	IC 74AC08 QUAD 2-INPUT AND	B	U15
25132	2.00	IC 74AC138 1 OF 8 DECODER	B	U47,48
25133	1.00	IC CS5102 A/D 16BIT	A	U9
25135	1.00	IC 80C186-20 UP PLCC	B	[U30]
25136	1.00	IC DS1233-10 ECONO RESET	A	U29
28004	1.00	VOLT REF 2.5	C	U27
28043	1.00	VOLT REF 1.2 LT1004 +/-4MV	B	CR5
28058	1.00	TRANS ARRAY 2003 DARL 5V	B	U11
28064	3.00	IC STEPPER MOTOR DRIVER	B	U25,39,54
28073	1.00	IC DS1215 TIME CHIP PHANTOM	A	U40
28115	1.00	OP AMP TL072	B	U12
28116	1.00	VOLT REF 5V LT1021	A	U10
29002	1.00	IC 7523 8-BIT D-A CONVERT	A	U17
29084	3.00	IC D/A DUAL 7 BIT	C	U24,38,53
29106	2.00	IC 128KX8 CMOS STATIC RAM	H	U36,51
29130	2.00	IC AM29F040-120 512K FLSH MEM	A	U34,49
29131	1.00	TRANSZORB 33V 1.5KE33A	A	CR2
29132	2.00	IC FLASH MEM 128KX8	F	U35,50
31001	1.00	RES 2.10K OHM 1% 1/4W	B	R4
31300	6.00	RES 30.0 OHM 5% 1/4W	B	R51-56
32028	1.00	RES 49.90K OHM 1% 1/4W	B	R24
32039	1.00	RES 1.00M OHM 1% 1/4W	B	R14
32042	1.00	RES 10.00K OHM 1% 1/4W	B	R65

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS
PART: 7330410
DESC: OBSOLETE SEE 7330415 REV: J
AS OF: 6/16/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
32047	9.00	RES 1.000K OHM 1% 1/4W	B	R1,17,33,34,39,40,45,46,[67]
32085	4.00	RES 15.00K OHM 1% 1/4W	B	R28,41,42,50
32099	2.00	RES 10.00 OHM 1% 1/4W	B	R10,11
32112	3.00	RES 2.00K OHM 1% 1/4W	B	R21,23,63
32113	1.00	RES 4.02K OHM 1% 1/4W	B	R16
32140	1.00	RES 6.19K OHM 1% 1/4W	B	R18
32141	1.00	RES 6.65K OHM 1% 1/4W	B	R5
32158	1.00	RES 2.49M OHM 1% 1/4W	C	R62
32195	4.00	RES 22.10 OHM 1% 1/4W	B	R12,13,25,49
32228	1.00	RES 3.83K OHM 1% 1/4W	B	R3
32232	8.00	RES 200.00OHM 1% 1/4W	B	R6-8,15,20,26,27,66
32296	1.00	RES 3.32K 1% 1/4W	B	R2
33047	6.00	RES 1.00 OHM 1% 1W	B	R31,36-38,43,48
33074	1.00	RES 68 OHM 5% 1/2W	F	[R68]
35009	1.00	TRIMPOT 20K, 25T	A	RT1
37002	4.00	RESNET 10K OHM 5R 6P SIP	A	RN5-7,13
37007	3.00	RESNET 180 OHM 5R 10P SIP	A	RN2-4
37046	6.00	RESNET 10K SIP 10PIN 9RES 5%	A	RN1,8-12
37094	1.00	RES 10.00K OHM .1% 1/4W 5PPM	B	R61
38062	1.00	RES 75 OHM 5% 1 WATT	B	R64
38063	1.00	RES 29.4K .1% 1/4W	B	R60
42150	1.00	HEDR 12-P .100 RTANG BRKS	B	J9
42171	1.00	CONN 5PIN .1 RT ANGL	A	J3
42225	1.00	HEDR 3-P .156 LOK	A	J1
42269	1.00	HEDR 26P DUAL ROW 0.100	B	J5
42311	1.00	HEDR 14PIN .1X.1 FOR LCD	B	[ ]
42332	3.00	HEDR 4-P .100 RTANG POLARIZED	B	J2,7,8
42552	1.00	CONN 12P .049 RT STR RLF	A	J6
46082	1.00	FUSE RESETABLE 5A PCB MNT	A	F1
48225	1.00	LABEL WHITE .80 X .25	C	MARK WITH A PART NUMBER PCB
49014	9.00	TERM PCB	B	TP1-9
49149	2.00	SOCKET IC 28-PIN DIP	B	SOCKET FOR U37,52
49478	1.00	SOCKET 84-PIN PLCC	A	SOCKET FOR U30
49694	1.00	HEDR 10P .1	B	J4
49741	1.00	CRYSTAL 32.768KHZ	A	[Y1]
49743	1.00	CRYSTAL CLOCK OSC 32 MHZ	B	U28
62027	1.00	FILTER EMI SUPPR .5-1GHZ	A	U3
63018	2.00	INDUCTOR 220UH	A	[L1,2]
71022	0.01 FT	WIRE SOLID 24 AWG TEFLON	B	[A/R]

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS
PART: 7330410
DESC: OBSOLETE SEE 7330415 REV: J
AS OF: 6/16/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
7330400-TP	0.00	MAIN PCB ASBY	C	DOCUMENT ONLY
7330410-AS	0.00	-MAIN PCB (LESS FRONT END)	E	DOCUMENT ONLY
7330410-SC	0.00	-MAIN PCB (LESS FRONT END)	B	DOCUMENT ONLY
7330505	1.00	PCB W/SWAGES ASBY	A	
7330525	1.00	CABLE DAUGHTER PCB INTRCON	B	CABLE H
81004	10.00	CAP 100 UF 63V ELEC	A	C1,3,4,7,18,19,61,64,65,111
81006	1.00	CAP 470 uF 10V ELEC	F	C2
81021	1.00	CAP 680 UF 50V ELEC VERTICAL	C	C5
81027	2.00	CAP 10000UF ELECTROLYTIC	A	C117,[C118]
82003	6.00	CAP 10 uF 25V TANT	C	C32,34,38,68,71,116
82005	18.00	CAP 1uF 35V TANT	D	C8,10-17,20,25,26,33,93,99, 101,103,105
83021	1.00	CAP 1000 pF 200V DISC	A	C28
83023	1.00	CAP 100pF 200V DISC	A	C45
83049	4.00	CAP 33PF 100V CER	A	C113,114,22,23
84003	1.00	CAP .068 uF 100V FILM	A	C43
84039	8.00	CAP 820 PF 200V 10% X7R	A	C6,37,58,60,82,84,109,110
84054	3.00	CAP .0033UF FILM	A	C57,85,86
85002	1.00	CAP .01 uF 100V 1%	E	C115
85024	60.00	CAP .1UF 50V CER	A	C9,21,24,27,29-31,35,36 ,39-42, 44,46-49,51-56,59, 62,63, 66,67, 69,70,72-81, 83,87-92,94-98, 100,102,104,106-108,119
04018	1.00	LCD 2X24 SUPERTWIST DISPLAY	C	"[DSP1]"
12089	4.00	SCR PAN 2-56X1/4 SS PHIL	A	[]
16001	4.00	LKWSHR #2 HELICAL SPR	A	[]
32044	2.00	RES 20.00K OHM 1% 1/4W	B	R19,22
47049	1.00	BATTERY 3V LITHIUM COIN	A	"[BT1]"
47050	1.00	BATTERY HOLDER 3V LITH COIN	A	"[BT1 HOLDER]"
54005	1.00	SW DIP 4-SW SIDE-ACT	A	"[SW1]"
65020	1.00	BUZZER 3-16V PIEZO	C	"[BP1]"
7330200	1.00	FIRMWARE ASBY	C	['HIGH' IN U52] ['LOW' IN U37]
32126	1.00	RES 1.870K OHM 1% 1/4W	B	R9
42310	1.00	HEDR 14PIN FOR LCD MOUNTING	A	[J10]
37114	1.00	CERAMIC RESONATOR 2.00MHZ	A	Y2

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS
PART: 7330413
DESC: PCB FRONT END UV CUR AMP ASBY REV: F
AS OF: 6/29/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
7330413-SC	0.00	PCB FRONT END UV CUR AMP	A	DOCUMENT ONLY
7331404	1.00	PCB CURRENT AMP	C	
84041	2.00	CAP .1 UF 50V X7R SIZE 1206	A	C3,4
84056	2.00	CAP 100pf 100V CER 1206	A	C1,2
P481	0.00	CTG PROC,ASBY 7330414 PRCS	B	DOCUMENT ONLY

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS
PART: 7330414
DESC: PCB FRONT END CUR AMP ASBY REV: F
AS OF: 6/29/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
7330404-SC	0.00	PCB CURRENT AMP ASBY	A	DOCUMENT ONLY
7331404	1.00	PCB CURRENT AMP	C	
84041	2.00	CAP .1 UF 50V X7R SIZE 1206	A	C3,4
84056	2.00	CAP 100pf 100V CER 1206	A	C1,2
P481	0.00	CTG PROC,ASBY 7330414 PRCS	B	DOCUMENT ONLY

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS
PART: 7330415
DESC: MAIN PCB ASBY REV: E
AS OF: 6/29/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
04018	1.00	LCD 2X24 SUPERTWIST DISPLAY	C	#[DSP1]#
12089	4.00	SCR PAN 2-56X1/4 SS PHIL	A	[]
16001	4.00	LKWSHR #2 HELICAL SPR	A	[]
21010	3.00	DIODE IN5821 SCHTKY 30V 1/4W	B	CR1,3,4
23013	1.00	OP AMP LT1012CN8 SINGLE	B	U18
23021	1.00	VOLT REG +ADJ 1.5A 317	C	U5
23026	1.00	VOLT REG +5V 78L05A	A	U7
23029	1.00	VOLT REG -5V 79L05	A	U6
23072	1.00	VOLT REG LM2575T	C	U1
23092	1.00	VOLT REG ADJ LM2576 SWTCH	A	U2
25027	2.00	IC 74HC595 SHIFT REG 8BIT 3ST	B	U13,14
25051	1.00	IC 74LS04 HEX INVERTER	D	U41
25084	2.00	IC 74HC541 TS OCT BFR NONINV	E	U23,43
25086	5.00	IC 74HC574 OCTAL D FLIP-FLOP	C	U20,21,26,44,45
25094	1.00	IC L7662CPA NEG CONVERTER	B	U4
25106	1.00	IC 74AC245 OCTAL TRNSCEIVER	F	U22
25107	2.00	IC 74AC32 QUAD 2-INPT OR GATE	E	U16,42
25108	1.00	IC LT1017CN8 COMPARATOR	A	U60
25114	1.00	IC LT1080 RS232 DRU/RECEIVER	A	U8
25130	3.00	IC 74AC373 OCTAL LATCH	A	U31-33
25131	1.00	IC 74AC08 QUAD 2-INPUT AND	B	U15
25132	2.00	IC 74AC138 1 OF 8 DECODER	B	U47,48
25133	1.00	IC CS5102 A/D 16BIT	A	U9
25135	1.00	IC 80C186-20 UP PLCC	B	[U30]
25136	1.00	IC DS1233-10 ECONO RESET	A	U29
28004	1.00	VOLT REF 2.5	C	U27
28043	1.00	VOLT REF 1.2 LT1004 +/-4MV	B	CR5
28058	1.00	TRANS ARRAY 2003 DARL 5V	B	U11
28064	3.00	IC STEPPER MOTOR DRIVER	B	U25,39,54
28073	1.00	IC DS1315 TIME CHIP PHANTOM	B	U40
28115	1.00	OP AMP TL072	B	U12
28116	1.00	VOLT REF 5V LT1021	A	U10
29002	1.00	IC 7523 8-BIT D-A CONVERT	A	U17
29084	3.00	IC D/A DUAL 7 BIT	C	U24,38,53
29106	2.00	IC 128KX8 CMOS STATIC RAM	H	U36,51
29131	1.00	TRANSZORB 33V 1.5KE33A	A	CR2
29132	2.00	IC FLASH MEM 128KX8	F	U35,50
29142	2.00	IC AM29F040-120JC	B	[U34,U49]
31300	6.00	RES 30.0 OHM 5% 1/4W	B	R51-56
32028	1.00	RES 49.90K OHM 1% 1/4W	B	R24

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS
PART: 7330415
DESC: MAIN PCB ASBY REV: E
AS OF: 6/29/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
32039	1.00	RES 1.00M OHM 1% 1/4W	B	R14
32042	1.00	RES 10.00K OHM 1% 1/4W	B	R65
32044	2.00	RES 20.00K OHM 1% 1/4W	B	R19,22
32047	9.00	RES 1.000K OHM 1% 1/4W	B	R1,17,33,34,39,40,45,46,67
32085	4.00	RES 15.00K OHM 1% 1/4W	B	R28,41,42,50
32099	2.00	RES 10.00 OHM 1% 1/4W	B	R10,11
32112	3.00	RES 2.00K OHM 1% 1/4W	B	R21,23,63
32113	1.00	RES 4.02K OHM 1% 1/4W	B	R16
32140	1.00	RES 6.19K OHM 1% 1/4W	B	R18
32146	1.00	RES 10.70K OHM 1% 1/4W	B	R5
32158	1.00	RES 2.49M OHM 1% 1/4W	C	R62
32195	4.00	RES 22.10 OHM 1% 1/4W	B	R12,13,25,49
32228	1.00	RES 3.83K OHM 1% 1/4W	B	R3
32232	8.00	RES 200.00OHM 1% 1/4W	B	R6-8,15,20,26,27,66
32296	1.00	RES 3.32K 1% 1/4W	B	R2
33047	6.00	RES 1.00 OHM 1% 1W	B	R31,36-38,43,48
33074	1.00	RES 68 OHM 5% 1/2W	F	R68
35009	1.00	TRIMPOT 20K, 25T	A	RT1
37002	4.00	RESNET 10K OHM 5R 6P SIP	B	RN5-7,13
37007	3.00	RESNET 180 OHM 5R 10P SIP	A	RN2-4
37046	6.00	RESNET 10K SIP 10PIN 9RES 5%	A	RN1,8-12
37094	1.00	RES 10.00K OHM .1% 1/4W 5PPM	B	R61
37114	1.00	CERAMIC RESONATOR 2.00MHZ	A	Y2
38062	1.00	RES 75 OHM 5% 1 WATT	B	R64
38063	1.00	RES 29.4K .1% 1/4W	C	R60
42150	1.00	HEDR 12-P .100 RTANG BRKS	B	J9
42171	2.00	CONN 5PIN .1 RT ANGL	A	J3,J11
42225	1.00	HEDR 3-P .156 LOK	A	J1
42269	1.00	HEDR 26P DUAL ROW 0.100	B	J5
42310	1.00	HEDR 14PIN FOR LCD MOUNTING	A	[J10]
42311	1.00	HEDR 14PIN .1X.1 FOR LCD	B	[ ]
42332	3.00	HEDR 4-P .100 RTANG POLARIZED	B	J2,7,8
42552	1.00	CONN 12P .049 RT STR RLF	A	J6
46082	1.00	FUSE RESETABLE 5A PCB MNT	A	F1
47049	1.00	BATTERY 3V LITHIUM COIN	A	#[BT1]#
47050	1.00	BATTERY HOLDER 3V LITH COIN	A	"[BT1 HOLDER]"
48225	1.00	LABEL WHITE .80 X .25	C	MARK WITH A PART NUMBER PCB
49014	9.00	TERM PCB	B	TP1-9
49149	2.00	SOCKET IC 28-PIN DIP	B	SOCKET FOR U37,52

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS
PART: 7330415
DESC: MAIN PCB ASBY REV: E
AS OF: 6/29/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
49478	1.00	SOCKET 84-PIN PLCC	A	SOCKET FOR U30
49536	1.00	HEDR 2PIN .1	A	P1
49694	1.00	HEDR 10P .1	B	J4
49741	1.00	CRYSTAL 32.768KHZ	A	[Y1]
49743	1.00	CRYSTAL CLOCK OSC 32 MHZ	B	U28
49878	2.00	SOCKET 32 PIN PLCC	A	SOCKET FOR U34,U49
54005	1.00	SW DIP 4-SW SIDE-ACT	A	#[SW1]#
62027	1.00	FILTER EMI SUPPR .5-1GHZ	A	U3
65020	1.00	BUZZER 3-16V PIEZO	C	"[BP1]"
7330200	1.00	FIRMWARE ASBY	C	['HIGH' IN U52] ['LOW' IN U37]
7330400-TP	0.00	MAIN PCB ASBY	D	DOCUMENT ONLY
7330415-AS	0.00	-MAIN PCB ASBY	A	DOCUMENT ONLY
7330415-SC	0.00	-MAIN PCB ASBY	B	DOCUMENT ONLY
7330416	1.00	MAIN PCB W/SWAGES ASBY	A	
81004	10.00	CAP 100 UF 63V ELEC	A	C1,3,4,7,18,19,61,64,65,111
81006	1.00	CAP 470 uF 10V ELEC	F	C2
81021	1.00	CAP 680 UF 50V ELEC VERTICAL	C	C5
82003	6.00	CAP 10 uF 25V TANT	C	C32,34,38,68,71,116
82005	18.00	CAP 1uF 35V TANT	D	C8,10-17,20,25,26,33,93,99, 101,103,105
83021	1.00	CAP 1000 pF 200V DISC	B	C28
83023	1.00	CAP 100pF 200V DISC	B	C45
83049	4.00	CAP 33PF 100V CER	A	C113,114,22,23
84003	1.00	CAP .068 uF 100V FILM	B	C43
84039	8.00	CAP 820 PF 200V 10% X7R	A	C6,37,58,60,82,84,109,110
84054	3.00	CAP .0033UF FILM	A	C57,85,86
85002	1.00	CAP .01 uF 100V 1%	F	C115
85024	58.00	CAP .1UF 50V CER	A	C9,21,24,27,29-31,35,36,39 -42, 44,59,62,63,66,67,69,70 ,72-81, 83,87-92,94-98,100 ,102,104, 106-108,119,46- 48,52-56
32126	2.00	RES 1.870K OHM 1% 1/4W	B	R4,R9
63018	2.00	INDUCTOR 220UH	A	L1,L2
81027	2.00	CAP 10000UF ELECTROLYTIC	A	C117,118

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS
PART: 7330500
DESC: GENERIC FINAL KIT REV: T
AS OF: 6/29/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
14003	2.00	NUT HEX 4-40 STEEL	C	
14005	2.00	NUT HEX 8-32 SS	A	
16017	1.00	LKWSHR #10 HELICAL SPR SS	A	
16052	2.00	WSHR .187ID .312OD .050THKNY	A	
17031	1.00	WSHR FENDER #8X.75X.060 SZ	A	
17056	1.00	WSHR FL .219IDX.438ODX.049 SS	A	
17059	4.00	WSHR FL .188IDX.375ODX.049 SS	A	
18034	2.00	WSHR SPRING WAVE #4 SS	B	
19055	1.00	SCR SOCK CAP 6-32X5/8 BLK	A	
19112	2.00	SCR SOCK CAP 4-40X3/8 SS	B	
19170	5.00	SCR SOCK CAP 6-32X5/16 SS	A	
19189	2.00	SEMS 6-32X3/8 ST PHIL ITOOTH	A	
19335	2.00	SCR SOCK CAP 8-32 X 3/4 BLK	A	
42210	2.00	SCREWLOCK FM/25P SUB D	A	
49166	4.00	FOOT RUBBER CONE BLACK	A	
49539	2.00	CLIP WIRE PVC SELF ADHESIVE	A	
49845	1.00	RUBBER FOOT .81" DIA,GREY,PSA	A	
71154	1.00	FLEX CIRCUIT 12 COND 8.00" SR	A	
7330401	1.00	MOVING INTCON PCB ASBY	A	
7330502	1.00	CABLE MOTOR Y AXIS ASBY	C	CABLE A
7330503	1.00	CABLE POWER INPUT ASBY	D	CABLE B
7330506	1.00	CABLE OPTO 14L ASBY	B	CABLE E
7331004	1.00	OVRLY REAR	A	
7332006	1.00	SHAFT Y-AXIS	B	
7332008	1.00	SPRING MICROPLATE RETAINING	C	
7332011	1.00	COVER BOTTOM	D	
7332021	1.00	SPACER FILTER WHEEL MOTOR	A	
7332027	1.00	POST FILTER WHEEL	C	
7332029	1.00	BRACKET CARRIER ASBY	C	
7332035	2.00	WSHR TOP COVER LOCATING	A	
7332042	2.00	BLOCK SHAFT SUPPORT	A	
7332080	4.00	SHIM OPTICS ARM	A	
7332084	1.00	SPRING LENS RETAINING	A	
7332085	1.00	SPACER DETECTOR PCB	A	
7332087	5.00	SPACER FF COVER BOTTOM	B	
7332516	0.00	JIG RUBBER FOOT PLACEMENT	A	DOCUMENT ONLY
7333002	1.00	CABLE ASBY RS232 INTFC 486CPU	B	
75049	1.00	CABLE PARLLEL PORT DB25-13X2	A	
49128	6.00	SPCR FF 6-32X.25L HEXAL	B	
17033	2.00	WSHR FLAT #4 .125X.250 SS	A	

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS
PART: 7330500
DESC: GENERIC FINAL KIT REV: T
AS OF: 6/29/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
16002	4.00	LKWSHR #4 HELICAL SPR SS	A	
16003	12.00	LKWSHR #6 HELICAL SPR SS	A	
17055	4.00	WSHR FL .156IDX.375ODX.049 SS	A	
19145	2.00	SCR SOCK CAP#4-40X1/4" SS	A	
19017	1.00	SCR SOCK CAP 8-32X3/8 BLK	A	
19331	4.00	SPCR MF 8-32X1.625 STEEL HEX	A	
7332028	1.00	SPACER TENSION ARM	C	
7120595	1.00	IDLER PULLEY ASBY	B	
17003	4.00	WSHR FL .156IDX.312OD	B	
7332020	1.00	ARM BELT TENSION	B	
7332004	1.00	SPRING TORSION	B	
16016	8.00	LKWSHR #8 HELICAL SPR SS	A	
17054	7.00	WSHR FL .188IDX.438ODX.049 SS	C	
7332001	1.00	FILTER PHOTO DETECTOR BG-18	A	
7332024	1.00	HOLDER OPTICAL SENSOR	B	
3402000	1.00	LENS, BICONVEX BK7	C	
19143	4.00	SCR SOCK CAP#8-32X1/2 SS	A	
19186	14.00	SEMS 6-32X1/4 ST PHIL ITOOTH	A	
66006	0.01	LOCTITE 242 BLUE	A	A/R
66033	0.01	LOCTITE INSTANT GEL	C	A/R
18038	4.00	WSHR .130IDX.250ODX.020T NYLN	A	
7332031	1.00	SPCR,FF,CVR,BTM,RELIEVED	D	

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS
PART: 7330501
DESC: CABLE LAMP ASBY REV: C
AS OF: 7/11/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
42374	2.00	TERM CRIMP PIN 22AWG GOLD	B	USED ON CABLE "C"
42381	1.00	CONN 4-P .100 RCPT	A	USED ON CABLE "C"
48221	1.00	LABEL CABLE 1" X .5" X 1.4"	B	USED ON CABLE "C"
49380	1.00	BULB 3.5V .45AMP	F	USED ON CABLE "C"
7330501-AS	0.00	-CABLE LAMP ASBY	C	DOCUMENT ONLY

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS
PART: 7330502
DESC: CABLE MOTOR Y AXIS ASBY REV: C
AS OF: 7/11/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
19169	1.00	CLIP,EXTRNL RETAN RING .25	A	USED ON CABLE "A"
3122023	1.00	MOTOR,STPR 1.8DEG,FLAT SHAFT	G	USED ON CABLE "A"
4032126	1.00	PULE,TIMBLT 18TOOTH MOLDED	D	USED ON CABLE "A"
42375	4.00	TERM CRIMP SOC 22AWG GOLD	B	USED ON CABLE "A"
42377	1.00	CONN 4-S .100 22-28GA RCPT	B	USED ON CABLE "A"
48221	1.00	LABEL CABLE 1" X .5" X 1.4"	B	USED ON CABLE "A"
71035	0.21 FT	SHRINK TUBE 1/4"	A	2.5", USED ON CABLE "A"
7330502-AS	0.00	-CABLE MOTOR Y AXIS ASBY	C	DOCUMENT ONLY
42058	1.00	TIE WRAP 3"	A	USED ON CABLE "A"

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS
PART: 7330503
DESC: CABLE POWER INPUT ASBY REV: D
AS OF: 7/11/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
42086	2.00	TERM FTAB .25 22-18 INS TL1	C	USED ON CABLE "B"
42177	1.00	INDS 3-S .156 18GA	A	USED ON CABLE "B"
42551	1.00	CONN DC INPUT 5.5X2.1MM	B	USED ON CABLE "B"
48221	1.00	LABEL CABLE 1" X .5" X 1.4"	B	USED ON CABLE "B"
54013	1.00	SW SPST ROCKER PANEL MNT	B	USED ON CABLE "B"
71093	1.10 FT	WIRE 18AWG UL1007 RED	B	4.0",3.5",5.0"
7330503-AS	0.00	-CABLE POWER INPUT ASBY	D	DOCUMENT ONLY

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS
PART: 7330504
DESC: CABLE LAMP EXTENSION ASBY REV: D
AS OF: 7/11/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
42477	4.00	TERM CRIMP FEMALE 22-26AWG	B	USED ON CABLE "D"
48221	1.00	LABEL CABLE 1" X .5" X 1.4"	B	USED ON CABLE "D"
71024	0.25 FT	SHRINK TUBE 1/8"	B	3", USED ON CABLE D
71108	0.38 FT	WIRE 22AWG UL1007 BLUE	B	4.5", USED ON CABLE D
7330504-AS	0.00	-CABLE LAMP EXTENSION ASBY	D	DOCUMENT ONLY
42480	2.00	CONN 4P POL/LAT .1 UNLOAD RCT	A	USED ON CABLE "D"
71101	0.38 FT	WIRE 22AWG UL 1007 BLACK	B	4.5", USED ON CABLE D

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS
PART: 7330506
DESC: CABLE OPTO 14L ASBY REV: B
AS OF: 7/11/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
28030	1.00	SW OPTO SLTTD W/LDS LOGIC TABS	F	USED ON CABLE "E"
42477	5.00	TERM CRIMP FEMALE 22-26AWG	B	USED ON CABLE "E"
42481	1.00	CONN 5P POL/LAT .1 UNLOAD RCTA		USED ON CABLE "E"
48221	1.00	LABEL CABLE 1" X .5" X 1.4"	B	USED ON CABLE "E"
7330506-AS	0.00	-CABLE OPTO 14L ASBY	B	DOCUMENT ONLY

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS
PART: 7330507
DESC: CABLE X AXIS MOTOR REV: A
AS OF: 7/11/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
42365	4.00	TERM .100 24-30GA GOLD	B	USED ON CABLE F
42377	1.00	CONN 4-S .100 22-28GA RCPT	B	USED ON CABLE F
48221	1.00	LABEL CABLE 1" X .5" X 1.4"	B	USED ON CABLE F
68019	1.00	MOTOR STEPER SIZE 17 SGL SFT	D	USED ON CABLE F
71035	0.25 FT	SHRINK TUBE 1/4"	A	3", USED ON CABLE F
7330507-AS	0.00	-CABLE X AXIS MOTOR	A	DOCUMENT ONLY

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS
PART: 7330508
DESC: MECH PRE ASSEMBLED ASBY REV: M
AS OF: 7/11/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
18041	1.00	SCR SET 2-56X3/32 SS CUPPT	A	
2872266	1.00	FLTR WHEEL DRIVE GEAR MOD	B	
7330508-AS	0.00	-MECH PRE ASSEMBLED ASBY	C	DOCUMENT ONLY
7330515	1.00	CARRIER ASBY	F	
7330522	1.00	OPTIC ARM ASBY	C	
8050509	1.00	CABLE FLTR WHEEL MTR ASBY	B	CABLE BJ
66006	0.01	LOCTITE 242 BLUE	A	A/R

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS
PART: 7330509
DESC: CABLE LAMP UV ASBY REV: A
AS OF: 7/11/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
7330509-AS	0.00	-CABLE LAMP UV ASBY	A	DOCUMENT ONLY
42374	2.00	TERM CRIMP PIN 22AWG GOLD	B	USED ON CABLE G
42381	1.00	CONN 4-P .100 RCPT	A	USED ON CABLE G
48221	1.00	LABEL CABLE 1" X .5" X 1.4"	B	USED ON CABLE G
49763	1.00	BULB 4.0V 1.20 AMP	A	USED ON CABLE G

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS
PART: 7330522
DESC: OPTICS ARM ASBY REV: C
AS OF: 7/11/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
16002	2.00	LKWSHR #4 HELICAL SPR SS	A	
17033	2.00	WSHR FLAT #4 .125X.250 SS	A	
19105	1.00	SCR SET 6-32 X 1/8 CUPPT SS	A	
19145	4.00	SCR SOCK CAP#4-40X1/4" SS	A	
3012010	2.00	RETAINER BULB	A	
42058	1.00	TIE WRAP 3"	A	
49554	1.00	MOUNT CABLE TIE PAD .5 X .5	A	
7330501	1.00	CABLE LAMP ASBY	C	CABLE C
7330504	1.00	CABLE LAMP EXTENSION ASBY	D	CABLE D
7330522-AS	0.00	-OPTIC ARM ASBY	B	DOCUMENT ONLY
7332023	1.00	RETAINER MIRROR	A	
7332025	1.00	RING LENS RETAINING	B	
7332032	1.00	LENS OPTICAL	A	
7332033	1.00	MIRROR OPTICAL	B	
7332081	1.00	ARM OPTICAL MACHINED	A	
66006	0.01	LOCTITE 242 BLUE	A	A/R

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS
PART: 7330523
DESC: OPTIC ARM UV ASBY REV: C
AS OF: 7/11/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
16002	2.00	LKWSHR #4 HELICAL SPR SS	A	
17033	2.00	WSHR FLAT #4 .125X.250 SS	A	
19105	1.00	SCR SET 6-32 X 1/8 CUPPT SS	A	
19145	2.00	SCR SOCK CAP#4-40X1/4" SS	A	
19186	2.00	SEMS 6-32X1/4 ST PHIL ITOOTH	A	
19218	2.00	SEMS 4-40X1/2 ST PHIL ITOOTH	A	
3090064	2.00	OVRLY 309 TEMP WARNING	A	
42058	1.00	TIE WRAP 3"	A	
49080	2.00	SPACER MF 6-32X.750 SS HX	C	
49221	2.00	SPACER THRU #4X.250 ALBRD	A	
49554	1.00	MOUNT CABLE TIE PAD .5 X .5	A	
7330504	1.00	CABLE LAMP EXTENSION ASBY	D	CABLE D
7330509	1.00	CABLE LAMP UV ASBY	A	CABLE G
7330523-AS	0.00	-OPTIC ARM UV ASBY	B	DOCUMENT ONLY
7332023	1.00	RETAINER MIRROR	A	
7332025	1.00	RING LENS RETAINING	B	
7332032	1.00	LENS OPTICAL	A	
7332033	1.00	MIRROR OPTICAL	B	
7332054	2.00	RETAINER BULB	C	
7332056	1.00	COVER OPTIC ARM	A	
7332082	1.00	ARM OPTICAL MACHINED UV	A	
66006	0.01	LOCTITE 242 BLUE	A	A/R
66033	0.01	LOCTITE INSTANT GEL	C	A/R

BILL OF MATERIALS REPORT

LAB PROPRIETARY FINISHED GOODS
PART: 7330524
DESC: OPTIC ARM NARROW BEAM ASBY REV: C
AS OF: 7/11/98

COMPONENT REFERENCE NUMBER	QTY PER ASSEMBLY	DESCRIPTION	REV	INFORMATION
16002	2.00	LKWSHR #4 HELICAL SPR SS	A	
17033	2.00	WSHR FLAT #4 .125X.250 SS	A	
19105	1.00	SCR SET 6-32 X 1/8 CUPPT SS	A	
19145	2.00	SCR SOCK CAP#4-40X1/4" SS	A	
19186	2.00	SEMS 6-32X1/4 ST PHIL ITOOTH	A	
19218	2.00	SEMS 4-40X1/2 ST PHIL ITOOTH	A	
3090064	2.00	OVRLY 309 TEMP WARNING	A	
42058	1.00	TIE WRAP 3"	A	
49080	2.00	SPACER MF 6-32X.750 SS HX	C	
49221	2.00	SPACER THRU #4X.250 ALBRD	A	
49554	1.00	MOUNT CABLE TIE PAD .5 X .5	A	
7330504	1.00	CABLE LAMP EXTENSION ASBY	D	CABLE D
7330509	1.00	CABLE LAMP UV ASBY	A	CABLE G
7330524-AS	0.00	-OPTIC ARM NB ASBY	B	DOCUMENT ONLY
7332023	1.00	RETAINER MIRROR	A	
7332033	1.00	MIRROR OPTICAL	B	
7332043	1.00	SPACER LENS	B	
7332044	1.00	HOLDER LENS	B	
7332047	2.00	LENS OPTICAL NARROW BEAM	B	
7332054	2.00	RETAINER BULB	C	
7332056	1.00	COVER OPTIC ARM	A	
7332083	1.00	ARM OPTICAL MACHINED NB	A	
66006	0.01	LOCTITE 242 BLUE	A	A/R
66033	0.01	LOCTITE INSTANT GEL	C	A/R

Service Parts List

ELX800	19337	Screw, 6-32 x 1 1/4
ELX800	28114	Photodiode, TO5
ELX800	41038	Belt, Timing, X
ELX800	41039	Belt, Timing, Y
ELX800	49746	Bungie Cord
ELX800	49748	Screw, 8-32 x 3/8
ELX800	54013	Switch, SPST, Rocker
ELX800	61062	Power Supply, 24 VDC
ELX800	68019	Stepper Motor, X-Axis
ELX800	68020	Motor, Filter Wheel
ELX800	71154	Flex Cable
ELX800	98145	Screw Driver
ELX800	99204	Rubber Band
ELX800	2872086	Filter Wheel Plug
ELX800	3122023	Stepper Motor, Y-Axis
ELX800	3402000	Lens, Biconvex
ELX800	7330202	Base Code, F/W
ELX800	7330203	Assay Config, F/W
ELX800	7330400	See 7330415
ELX800	7330401	Moving Intercon Asby
ELX800	7330404	See 7330414
ELX800	7330405	See 7330413
ELX800	7330410	PCB, Main (Obsolete see 7330415)
ELX800	7330413	PCB, Current Amp, UV
ELX800	7330414	PCB, Current Amp
ELX800	7330415	PCB, Main (Less Front End)
ELX800	7330513	Lamp Asby w/ Wrench
ELX800	7330516	Lamp Asby for UV/NB units
ELX800	7331001	Overlay, Kybd
ELX800	7331005	ELx800 Service Manual
ELX800	7332009	Cover, Top
ELX800	7332013	Carrier, Microplate
ELX800	7332032	Lens, Optical
ELX800	7332033	Mirror, Optical
ELX800	7332041	Stopping Block
ELX800	7332500	Filter Wheel Motor Spacer Jig
ELX800	7332508	Autocal Jig
ELX800	7332515	Go/NoGo Jig (STD/UV only)
ELX800	7332514	Go/NoGo Jig (NB only)
ELX800	8050517	Cable, Motor Asby
ELX800	8290202	Define Reader Protocol Install
ELX800	04018	Display, 2 x 24